High School Reform: How Can Evidence Guide Policy and Practice?

A public policy forum presented by the:

Center for Education at the National Academies,
Education Sector,
National Education Knowledge Industry Association

With support from the
KnowledgeWorks Foundation

9:00 AM to 12:00 PM Friday, March 24, 2006
The National Academies. 500 Fifth Street, NW, Washington, DC

EDUCATIONSECTOR
Independent Analysis, Innovative Ideas

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

nekia

High School Reform: How Can Evidence Guide Policy and Practice?

A public policy forum presented by the:
Center for Education at the National Academies, Education Sector, and National Education Knowledge Industry Association
(With support from the KnowledgeWorks Foundation)
The National Academies · March 24, 2006 · 9:00 AM to 12:00 PM

Agenda

(Registration beginning at 8:00 am)

9:00 to 9:10 AM	Welcome by **James Kohlmoos**, National Education Knowledge Industry Association (NEKIA), and **Harold Brown**, KnowledgeWorks Foundation
9:10 to 9:20 AM	Overview presentation, **Craig Jerald**, Break the Curve Consulting
9:20 to 10:30 AM	*Panel One: Research Perspectives on High School Reform* **Martin Orland**, Center for Education/National Academies (moderating) **Charles Barone**, Independent Consultant **James Kemple**, Manpower Demonstration Research Corporation **Valerie Lee**, University of Michigan **Becky Smerdon**, American Institutes for Research *Audience question and answer beginning at 10:00 AM.*
10:30 to 10:40 AM	Break
10:45 to 11:55 AM	*Panel Two: Practitioner and Policy Perspectives on High School Reform* **Thomas Toch**, Education Sector (moderating) **Deborah DeLisle**, Cleveland Heights Public Schools **Jo Lynne DeMary**, former Virginia Superintendent of Public Instruction **David Ferrero**, The Bill and Melinda Gates Foundation **Jeffrey Robinson**, Baltimore Talent Development High School *Audience question and answer beginning at 11:30 AM.*
12:00 PM	Closing remarks by **James Kohlmoos**, NEKIA, and adjournment

High School Reform: How Can Evidence Guide Policy and Practice?

A public policy forum presented by the:

Center for Education at the National Academies, Education Sector, and National Education Knowledge Industry Association

The National Academies · March 24, 2006 · 9:00 AM to 12:00 PM

Speaker Biographies

Charles Barone is an independent consultant on education policy issues whose clients include or have included the Trust for Early Education, the Education Trust – West, the Citizens' Commission on Civil Rights, and the National Academy of Sciences. From 1993 to 2003, Barone worked as a legislative aide on Capitol Hill, first as Chief Education Advisor to Senator Paul Simon, then as Democratic Deputy Staff Director on the House Education and Workforce Committee under the senior Democratic member, Congressman George Miller. He was the lead negotiator for House Democrats on the No Child Left Behind Act. Prior to coming to Capitol Hill, Barone was a Postdoctoral Fellow at Yale University, where he conducted both research and intervention projects in the New Haven Public School System.

Harold Brown is a Vice President at KnowledgeWorks Foundation, where he manages the Foundation's School Improvement program area. Currently, Brown oversees the Ohio High School Transformation and Early College High School Initiatives at KnowledgeWorks Foundation. Through these partnerships with the Bill & Melinda Gates Foundation, Jobs for the Future, the U.S. Department of Education, and the Ohio Department of Education, KnowledgeWorks Foundation is working in most of the state's urban school districts to transform large high schools into small, autonomous schools of about 400 students each, and to develop innovative small schools that are co-governed by public school districts and higher education institutions.

Prior to joining KnowledgeWorks in August 2000, Brown worked at Miami University of Ohio as Director of Multicultural Enrollment Services, and as Chief of Staff for the Vice President for Student Affairs. Brown also worked as Corporate Communications Coordinator for Student Loan Funding Resources, Ohio's designated student loan secondary market, and spent three years as a senior researcher and special projects consultant at WGBH, Boston's public television and radio station.

Deborah S. Delisle is the Superintendent of the Cleveland Heights-University Heights (OH) School District. She has also served in a variety of leadership positions including: Associate Superintendent, Director of Academic Services, Elementary Principal, Language Arts Specialist, and Coordinator of Gifted & Enrichment Program, in the Shaker Heights (OH) School District. Dr. Delisle has taught graduate level courses at Kent State University, Ursuline College, University of Northern Colorado and Simon Fraser University. She has given numerous professional presentations as far away as Hong Kong, China. Her most recent publication, Growing Good Kids, received a Parent Choice award.

Dr. Delisle was recently selected as the Most Influential Person in Cleveland Heights by the Sun Newspapers. She was listed several times in Who's Who of Professionals and Who's Who Among America's Teachers, was selected as one of America's Top Twenty Educators by Learning Magazine, was a Finalist for Ohio Teacher of the Year and received the Golden Apple Achiever Award from Ashland Oil Co. Cleveland Heights High School has been involved in the Ohio High School Transformation Initiative for the past three years. This high school was the recipient of grants from the KnowledgeWorks Foundation and the federal government to assist in the planning and implementation of five small learning communities.

Jo Lynne DeMary has the distinction of being the first woman to serve as state superintendent since the public school system in Virginia was created in 1870. She was appointed to the position by then-Governor Jim Gilmore (R) on June 1, 2000, after serving as acting superintendent since December 9, 1999. Dr. DeMary was re-appointed to a four-year term as Virginia's state Superintendent of Public Instruction by Governor Mark R Warner (D) on April 2, 2002. With more than 35 years of experience in public education, Dr. DeMary has served as a teacher, assistant principal, principal, elementary school supervisor, director of special education and assistant superintendent of public schools. From July 1, 1994 until she was appointed acting state superintendent, she served as assistant superintendent for instruction in the state department of education.

David J. Ferrero is Director of Research and Evaluation for the Education Division of the Bill & Melinda Gates Foundation. The Foundation's educational giving aims to raise high school graduation and college-going rates for black and Hispanic youth through scholarships and the development of small, rigorous, and supportive high schools. Prior to joining the foundation in 2000, Dr. Ferrero worked as a journalist and high school teacher outside Chicago; an education policy researcher for Achieve, Inc.; instructional coach for an after school enrichment program for inner city youth in Boston; and a consultant to the Massachusetts Commissioner of Education on teacher quality and alternative certification. More recently, he was a co-editor of and contributor to *Educating Citizens: International Perspectives on Civic Values and School Choice* (Brookings Press, 2004). Other recent writing focuses on values pluralism among educators and its implications for policy and practice.

Craig Jerald is an independent, Washington, D.C.-based consultant specializing in education policy, research, and practice. Over the past decade, Mr. Jerald's research has been cited in thousands of print, radio, and television news stories, and he has authored articles appearing in *Education Week*, *Principal*, *School Administrator*, *Educational Leadership*, the *San Diego Tribune*, and other publications.

From July 2000 to July 2004, Mr. Jerald was a principal partner and senior policy analyst at The Education Trust, where he worked extensively on issues related to teacher quality, accountability, federal education policy, and practices of high-performing schools and districts. As a senior editor at *Education Week* from 1996 to 2000, Mr. Jerald founded and managed the organization's research division and helped create *Ed Week*'s special annual reports series, *Quality Counts* and *Technology Counts*, for both of which he served as project director. Mr. Jerald also has been a program analyst at the U.S. Department of Education and began his career as a Teach for America recruit and middle school teacher of English, history, and mathematics in California's Long Beach Unified School District.

James J. Kemple is the director of MDRC's K-12 Education Policy Area. He has served as principal investigator and research director on a variety of MDRC's education, employment and training, and welfare-to-work program evaluations. He is the Principal Investigator for the Career Academies Evaluation and the National Evaluation of the Talent Development model. He led the site selection process for the National Reading First Impact Study and serves as co-director for that study, which MDRC is conducting with Abt Associates. He also serves as a senior advisor and policy analyst for the Education, Children and Youth division. As a practitioner, he taught high school math and managed a three-phased supplementary academic and high school placement program for disadvantaged youth in Washington, D.C.

Jim Kohlmoos is the President and CEO of the National Education Knowledge Industry Association (NEKIA), a non partisan trade association dedicated to the effective use of research-based knowledge in education policy and practice. With three decades of experience in educational leadership and innovation in both the public and private sectors, Kohlmoos is charged with leading a national advocacy effort to expand support for evidence-based education and knowledge-based solutions in school improvement.

Prior to joining NEKIA in 2001, Kohlmoos was a vice president of Implementation Group, where over a two- year period as vice president he built an extensive bi-partisan government relations practice in elementary and secondary education. From 1993 to 2000 Kohlmoos served at the U.S. Department of Education as both a Deputy Assistant Secretary of Elementary and Secondary Education and as a Senior Adviser and Special Assistant. He also served on the Presidential Transition Team in 1992. From 1977 to 1993, he worked at the close Up Foundation first as an instructor and director and then as vice president.

Kohlmoos began his professional career in education 1971 with the U.S. Teacher Corps in Salinas, CA. He subsequently served as a teacher trainer with the Peace Corps, which took him to Malaysia for three years. Kohlmoos holds a baccalaureate in history from Stanford University (1971), plus teacher credentials from the University of California.

Valerie E. Lee is a Professor of Education at the University of Michigan, where she has worked since 1986. She is also a faculty associate at the University's Institute for Social Research. She teaches courses in the sociology of education, program evaluation, and quantitative research methods. Her research focuses on issues of educational equity, particularly on identifying characteristics of schools that make them simultaneously excellent and equitable. Much of this research is oriented to public policies that relate to educational equity. Although much of her research has focused on secondary schools, more recently she has been studying similar issues in the early grades. "Equity" she defines in terms of socioeconomic status, race/ethnicity, and gender.

Martin E. Orland currently directs the Center for Education (CFE), which is housed in the National Research Council (NRC) of the National Academy of Sciences. The CFE is the locus of all education-related activities at the NRC, serving as host to a variety of expert boards and committees whose activities and products inform the pursuit and application of scientific knowledge for improving educational policy and practice in the United States. As director of the CFE, Dr. Orland is responsible for providing effective vision, leadership, and management in furtherance of this mission.

Immediately prior to becoming CFE Director, Dr. Orland was Special Assistant to the Director in the U.S. Department of Education's Institute of Education Sciences (IES), and Acting Director of the Office of Reform Assistance and Dissemination. From 1996 through 1999, Dr. Orland was Associate Commissioner with the National Center for Education Statistics (NCES). Prior to joining NCES, Dr. Orland spent two years as a Senior Fellow with The Finance Project and three years as a senior official with the National Education Goals Panel. Earlier in his career, Dr. Orland served as government project officer for a number of evaluation studies of the ESEA Title I program, and managed analyses documenting the relationship between concentrations of poverty in the schools and student achievement. He received his Ph.D. from Syracuse University's Maxwell School.

Jeffrey M. Robinson has been an educator in the Baltimore City Public School System for the past 13 years. His dedication to the system has allowed him to move up the professional ladder from a Physical Education teacher at Dr. Lillie M. Jackson Elementary to a Dean at Calverton Middle School; then as an assistant principal at the Baltimore Polytechnic Institute high School where he served for four and half years and now the principal of the Baltimore Talent Development High School.

Becky Smerdon is a Principal Research Scientist at the American Institutes for Research. Over the years, she has directed a number of large-scale projects that have examined a number of current policy-relevant topics (e.g., teacher quality, school construction, distance education). She is the principal investigator for the study of the Bill & Melinda Gates Foundation's high school reform initiative. She leads the AIR team, in association with SRI International, in examining the foundation's initiative through

analyzing school achievement data and conducting interviews, focus groups, and surveys to assess reform implementation. She is also co-director of the National High School Center. The Center's mission is to build capacity among regional centers to strengthen their knowledge and awareness of effective programs, practices, tools, and policies that hold potential for improving high school performance and student outcomes.

Thomas Toch is Co-founder and Co-director of Education Sector. Prior to launching Education Sector in 2005, Toch spent three years as Writer-in-Residence at the National Center on Education and Economy and Director of the NCEE Policy Forums program, three years as a Guest Scholar at the Brookings Institution, and a decade as a writer at *U.S. News and World Report*. He taught education policy at the Harvard Graduate School of Education in 1999. As a member of the staff that launched *Education Week* in the early 1980s, Toch served variously as writer, commentary editor, and co-managing editor. Toch is the author of two books on education policy and has contributed to *The New York Times*, *The New Republic* and a wide range of other national newspapers and magazines. His work has twice been nominated for National Magazine Awards, the magazine industry's equivalent of the Pulitzer Prizes.

EDUCATIONSECTOR
www.educationsector.org

EDUCATION SECTOR REPORTS March 2006

Measured Progress:

A Report on the High School Reform Movement

By Craig D. Jerald

About the Author

Craig Jerald is an independent consultant living and working in Washington, D.C. He has been a principal partner at the Education Trust, an advocacy and research organization, and a senior editor at *Education Week*, where he served as project director for the annual *Quality Counts* report. He can be contacted at cjerald@comcast.net.

About Education Sector

Education Sector is an independent education think tank based in Washington, DC. It is a nonprofit and nonpartisan organization devoted to developing innovative solutions to the nation's most pressing educational problems. It seeks to be a dependable source of sound thinking on education policy and an honest broker of evidence in key education debates in Washington and nationally.

Acknowledgements

Thomas Toch edited the report. Wray Herbert served as copyeditor. Sharon Cannon designed the publication.

This report was made possible in part by a grant from the Carnegie Corporation of New York. The statements made and views expressed are solely the responsibility of the author.

1101 Pennsylvania Ave, N.W., Fifth Floor, Washington, DC 20004
202.756.4944 • www.educationsector.org

Table of Contents

The Challenge

America's education reformers have focused tremendous energy on improving the nation's high schools in the last half decade. Spurred by sobering reports of ill-prepared students and a billion dollars in funding from the Bill and Melinda Gates Foundation, policymakers nationwide have embraced the issue. Political, business, and education leaders convened at a National Education Summit on High Schools in Washington, D.C. in 2005. Later that year, the National Governors Association awarded the first of nearly $24 million in grants to over two dozen states to develop comprehensive high school improvement plans and every governor has signed an unprecedented NGA pact to measure high school graduation rates more accurately.

Commission reports, conferences, and research briefs have made a compelling case for reform: Only 68 percent of the nation's high school freshmen—and only about half of African American and Hispanic students—graduate on time.[1] Just 57 percent of high school graduates take the core academic courses proposed by a national commission two decades ago.[2] As a result, only *one in three* high school freshmen graduate on time with the academic preparation necessary to succeed in college.[3]

And while test scores of younger students have risen in recent years, with 9-year-olds scoring higher in reading and math than ever before on national measures and racial achievement gaps at their lowest levels in 30 years of tracking them, today's 17-year-olds score no higher in reading and math than did teenagers in the early 1970s.[4]

Nor are high schools doing well by many of their best-prepared students. One quarter of Chicago students entering high school in 1999 in the city's top achievement quartile ran into serious academic trouble by the end of ninth grade, and only 37 percent of those struggling students graduated four years later.[5]

Today's calls for high school reform echo those of *A Nation At Risk* and other national studies of American education in the mid-1980s. The emerging knowledge-based economy, in which decent-paying jobs required brains rather than brawn, the reformers of that era argued, demanded that public high schools provide a rigorous academic education to their entire student population, rather than to only a small percentage of their students, as they had done in the past. Arguing that traditional academic disciplines were the best vehicle for preparing students for the new workplace and instilling in them a common "cultural language," reformers called for an academic core curriculum in the nation's high schools. "The best vocational education will be one in general education in the use of one's mind," argued Theodore Sizer in *Horace's Compromise*, his influential 1984 study of public high schools. Sizer, Ernest Boyer in his 1983 report *High School*, and John Goodlad in *A Place Called School* called for the nation's high schools to be reconfigured into smaller, more personal settings to combat the widespread apathy and alienation they attributed to the anonymity of the nation's many large, comprehensive high schools.

But as the school reform movement evolved during the 1980s and 1990s, reformers turned their attention to school choice and other market-based reforms and to the task of holding educators more accountable for student achievement. Many states followed *A Nation At Risk's* recommendation to raise high school course-taking requirements. But rarely did such steps result in meaningful changes in curriculum content, and only in a few states and school systems did policymakers respond to the calls for extensive high school reforms.

The Gates Foundation put high school reform back on the national agenda when in 2000 it launched a five-year high school initiative initially focused on addressing the anonymity that Sizer, Boyer,

and Goodlad had identified as such a significant detriment to the productivity of public high schools.

But today's high school reform agenda is in an important way much more ambitious than that of two decades ago. While *A Nation At Risk* warned that "America's position in the world" depended on most students being prepared for college or skilled jobs, the federally funded report never mentioned dropouts in its long list of indicators that America's education system was failing its students.[6]

Today, there is a clear consensus, expressed at the 2005 national high school summit, that high schools must find ways to ensure that all graduates leave prepared for college and skilled jobs, while *simultaneously* finding ways to curb the nation's massive dropout problem. High school reform, today's reformers believe, must combine both excellence and equity.

Thomas Toch, now co-director of Education Sector, framed the challenge in his 1990 book *In the Name of Excellence*. What is needed, he wrote, "is a synthesis, on a broad scale in public education, of the 1960s reformers' desire to humanize schools and the 1980s reformers' commitment to rigorous academic standards."[7]

An important aspect of that synthesis, today's reformers say, is providing students with a curriculum that is *both* more rigorous *and* more relevant, rather than engaging in the long-standing tradition in American secondary education of sacrificing one to optimize the other. The Gates Foundation has captured the major underlying principles of today's high school reform movement—and the movement's ambitiousness—in what it calls the Three R's: rigor, relevance, and relationships.

The movement resembles a sprawling 19th century Russian novel, with dozens of characters and innumerable subplots. And it is moving at the fast pace of a Hollywood thriller. But reformers are pursuing their ambitious agenda largely through five major strategies—improving school climate, strengthening curriculum and instruction, raising graduation requirements, helping freshmen get up to speed academically, and dropout prevention.

Importantly, these reform efforts have been accompanied by an equally ambitious effort to gauge the reforms' effectiveness. Education Sector has summarized the findings of this important new research in this report to give educators, policymakers, the press, and the general public a readily readable resource with which to pursue and evaluate high school reforms.

The Evidence

Personal, Challenging, Engaging

Thousands of educators are working to create high school environments in which learning is more likely to take place than is the case in many of the nation's typically large, often impersonal "comprehensive" high schools today. Supported by sizeable grants from Gates, the Carnegie Corporation of New York, and other philanthropies, they are replicating "model high schools" that have found ways to establish more supportive climates for learning, and they are breaking large high schools into "small learning communities" that share a building or campus, where anonymity gives way to a sense of community, a sense of shared purpose, and where, as a result, teachers and students are more motivated to work hard.

A substantial body of research supports these efforts and some of the most persuasive evidence comes from the work of Anthony Bryk, formerly of the University of Chicago and now at Stanford, and the University of Michigan's Valerie Lee. During the 1980s, these two researchers independently began questioning why Catholic school students were outperforming public school students, even when they came from similar backgrounds. What they found, somewhat surprisingly, is that student performance had little to do with better parenting or stricter discipline, but rather with how the parochial schools were organized and operated. They later found the same was true for better-performing public high schools. All else being equal, the researchers concluded, secondary schools do better when they are smaller; have high academic expectations for students; and have teachers who take collective responsibility for learning and establish strong, supportive relationships with students.[8]

The research shows, in other words, that good high schools push all students academically *and* give them lots of adult support, both inside and outside the classroom. This is the antithesis of many traditional, comprehensive high schools, where teachers work in

isolation, where few students are encouraged to work hard, and where those who struggle academically or socially are simply left to drift on their own.

Over the last six years, Gates alone has invested more than $1 billion to create more than 1,500 "small learning communities" of, optimally, fewer than 400 students each. Some were built from scratch while others were incorporated into existing school buildings. The new schools are replications of promising "model schools" that the foundation had identified throughout the country, such as High Tech High in San Diego. In other cases, existing high schools have been "redesigned" in order to break them up into smaller, semi-autonomous units.

The foundation also invested $5 million in a major, multi-year evaluation of the initiative conducted by the American Institutes for Research and SRI International, both of which are independent research organizations. Evaluators surveyed teachers and students in dozens of schools between 2002 and 2004 and followed up with visits to 30 schools during the 2003-04 school year. They judged how well the new schools were doing in the following areas: personally tailored learning, relationships based on mutual respect and responsibility, high expectations, a shared focus, and teacher collaboration.[9]

The foundation released a summary of the evaluation results to date in November 2005. During their first year in operation, the new schools came to resemble the models on which they were based, especially in the realm of relationship building. A typical comment: "Students feel cared for and supported [and] teachers work together collaboratively in a culture that focused first and foremost on the students." Although some schools were more successful than others, the report concluded that "most have the 'relationships' piece of the foundation's vision firmly in place."[10]

The redesigned high schools made less progress toward that vision than new ones. Indeed, a number of the redesigned schools continued to struggle with low attendance and other issues. Even so, such schools demonstrated marked improvements in school culture, especially in creating a more personalized, caring climate. "The most significant positive change […] was an improvement in interpersonal relations," the evaluators noted. "Students reported feeling better known and supported by school staff after school redesign."[11]

Though the early results were generally positive, the evaluators sounded one note of caution. Even within the same school building, there were significant differences in personalization and academic expectations among different small learning communities. In some cases, permitting students to choose their small learning communities "caused unequal distribution of various types of students."[12] Other recent research on efforts to create "schools within schools" has corroborated those cautionary findings, and suggests that the problem, if left unchecked, eventually could lead to students sorting themselves based on race, social class, and academic background, in effect recreating the school-initiated system of "tracking" students of different backgrounds into different academic programs, a vestige that the Gates reforms were intended to eliminate.[13]

Strengthening Curriculum and Instruction

Breaking down large, impersonal high schools into smaller learning communities, Gates and others reasoned, would help create conditions that would promote learning, and Gates conducted a second study to determine whether a more supportive learning climate translates into stronger curriculum and instruction in the classroom. During 2002-03 and 2003-04, evaluators collected classroom assignments and student work from 12 new high schools and 12 traditional, comprehensive high schools that had yet to be redesigned. They then asked experienced teachers to evaluate both the intellectual rigor of the assignments and how closely they were connected with real-world applications and student interests.

The findings were mixed. On the positive side, English teachers in new high schools gave students assignments that were much more demanding and more relevant than assignments given by their peers in traditional high schools. But math teachers in new schools were no more likely than those in conventional schools to assign intellectually demanding class work. Indeed, fully half of the math assignments collected from both types of schools exhibited "little or no" rigor.[14]

In English, student work tended to be of somewhat higher quality in new schools compared with what

students produced in traditional high schools. But in mathematics, students in the new schools actually did more poorly: 64 percent of student work samples were judged to be of very low quality, compared to 43 percent in traditional high schools.[15] Overall, the evaluators concluded that "the quality of student work in all of the schools we studied is alarmingly low."[16] It's not surprising then, that except for a slightly more positive trend in reading scores, test results in most Gates-funded schools generally are no better than in traditional schools, at least so far.[17]

The early structural changes in the foundation-sponsored schools were supposed to lay the groundwork for changes in teaching and learning, but that hasn't happened in very many places. Says Tom Vander Ark, Executive Director for the Bill and Melinda Gates Foundation's education initiatives: "With many of our early grants, I encouraged people to fix the architecture. Several years later, many of those same folks are stuck in architectural arguments and never got to the heart of the issue—teaching and learning."[18]

The message is that creating conditions in which learning can take place is critical but not sufficient. As Valerie Lee has written, "The positive link between social support and learning was *contingent* on the school also exerting considerable academic [pressure on students]."[19] Reform, it is increasingly clear, depends on improving both school climate and the quality and rigor of classroom instruction.

Mathematics presents a special challenge. Math teachers told the Gates-funded evaluators they had a very difficult time finding ways to make the subject more engaging and relevant for students while simultaneously covering all of the skills and concepts that states—and, for that matter, colleges—expect students to learn.

That's bad news for students. Math courses play an especially powerful "gatekeeper" role in college admissions and graduation, and success in the traditional math curriculum is a predictor of higher wages in the workplace.[20] Today, even "blue collar" jobs call for more than basic computational skills. Don Davis, the director of an apprenticeship program for union electricians in California, told the *Los Angeles Times* in January 2006 that "in the real world" wiring and plumbing buildings "requires algebra." [21]

Mid-course Corrections

The Gates Foundation began modifying its high school reform strategy as the results of the AIR/SRI evaluation began to emerge. While not abandoning its belief that high schools can change largely on their own, the foundation has now embraced a "tighter" approach designed to ensure that the schools it supports have rigorous standards and challenging classroom instruction. Says Vander Ark: "I visited 100 great schools and made the observation that they were all small, autonomous, and assumed that was a path to school improvement. It turns out giving a failing school autonomy is a bad idea."[22]

Gates has shifted a larger share of funding to "franchisers" and "charter management organizations," entities that offer much more specific curriculum-driven school improvement models. They also tend to take a more supportive—and sometimes more directive—hand in managing the academic affairs of high schools. Less is left to chance.

Other organizations involved in high school reform have come to the same conclusion as Gates about the need for prescriptive solutions for failing high schools. MDRC, a New York-based research and evaluation firm, in 2005 released an evaluation of efforts to replicate First Things First (FTF), a school-improvement model initially—and very successfully—implemented in Kansas City, (Kan.). The FTF model breaks high schools into small learning communities, provides students with one-on-one adult mentoring, and gives teachers opportunities to work together to improve their classroom teaching. The study concluded that: "Changes in structure (for example, the creation of small learning communities) took hold more easily than changes in instruction."[23]

Like the Gates Foundation, the Philadelphia-based Institute for Research and Reform in Education, which created the FTF model and helps schools implement it, has responded by adding more "non-negotiable" elements to its high school reform strategy. It has stopped using external consultants to help teachers improve instruction and instead developed a more uniform, systematic approach that can be used across high schools implementing the model, including specific ways teachers can collectively examine classroom teaching and

student work samples. It has also created on-line curriculum and assessment materials and contracted for a standardized literacy and math curriculum for students who enter several years below grade level.[24] Gates is also beginning to invest in more systemic reform strategies, rather than single-school solutions. It is helping school districts build portfolios of small schools that are better supported by common curricula, assessments, and "instructional management systems"—districtwide strategies that rely on frequent standardized learning assessments to monitor student progress and ensure the effectiveness of classroom teaching. As a sign of this philosophical shift, the foundation gave Atlanta $1.4 million to create a district-wide plan for ensuring rigorous classroom curricula and instruction in all of the city's high schools, including the new "small learning communities" being created with the foundation's support. And in Chicago it is supporting an effort that will permit high schools to choose from two or three "instructional models" deliberately aligned with the state's academic standards and with most college entrance requirements.

Mixing in Some College

The foundation has also invested more than $60 million to support the creation of so-called early college high schools, small secondary schools that integrate college courses into their curricula. This approach allows students to earn up to two years worth of credits toward a college degree while they earn their high school diploma. The aim is to eliminate wasted time during the junior and senior year and provide students with college-level content as soon as possible, giving them a head start on earning an eventual four-year degree. The initiative will create 170 new early college high schools by 2008, with the aim of enrolling about 68,000 students by 2012.[25]

Early college high schools are one strategy in a burgeoning movement to bring college into the high school classroom. Enrollment in the Advanced Placement program—which was introduced by the College Board in 1955 as a way to offer a small number of college-bound students the opportunity to take college-level coursework—has more than doubled over the last decade.[26] Last month the College Board released data showing that the proportion of public high school graduates who have earned a passing mark on one or more AP exams increased in all fifty states over the last five years, growing from about 10 percent nationally for the class of 2000 to 14 percent for the class of 2005.[27] Some states have encouraged greater participation in the AP program by offering to pay for students to take AP exams or providing training for teachers to learn how to teach the courses. And the Bush administration recently unveiled a proposal to more than double the number of high school teachers certified to teach AP math and science courses.

In addition to expanding AP, many states are encouraging "dual-enrollment" agreements between secondary and higher education systems, allowing high school students to take courses provided directly by colleges and universities themselves—either at the college or in high schools. Last year the U.S. Department of Education released a new study showing that over half of all U.S. colleges and universities enrolled high school students for college credit in 2002-03, and some 813,000 high school students—about one in twenty—participated.[28]

Although these initiatives have a great deal of common sense to recommend them, little formal research has been conducted on whether the effort to expand early college high schools, Advanced Placement courses, and dual enrollment will improve high school curricula or better prepare students for postsecondary success. Researchers agree that performing well on AP exams is a good predictor of college success, but disagree on whether simply completing an AP course has any value. A study by Saul Geiser and Veronica Santelices of the University of California, Berkeley, found that students who score well on AP exams have better college grades and graduation rates, but the same is not true for students who take AP courses without taking the exams or who receive low scores on the exams.[29] Researchers are conducting evaluations of dual-enrollment and early college high schools, but no results have been released yet.

Raising Academic Graduation Requirements

Reforms have also sought to ready more students for college by increasing graduation requirements in core academic subjects.

A 2002 federal survey found that 72 percent of high school sophomores said they expected to

earn a bachelor's degree or higher, yet only about 51 percent said they were enrolled in college-prep courses.[30] A follow-up survey conducted two years later found that, among seniors planning to attend a four-year college, nearly two thirds had not mastered intermediate-level mathematics concepts necessary for handling college-level work, and one third had not mastered even simple problem solving strategies requiring low-level math skills. [31]

Such students pay a steep price for lagging behind in high school. Nearly a third of recent high school graduates entering college fail placement tests and must enroll in remedial courses—classes that cover what students should have learned in high school and earn them no credit toward graduation.[32] Unfortunately, for too many students, the help is too little too late. Three out of four college freshmen who take a remedial reading course fail to earn a diploma, as do two out of three who have to take two remedial math classes.[33] Overall, less than 65 percent of students at four-year institutions earn a college degree within six years, a low rate of return due in part to poor high school preparation.[34]

In response, reformers have called on policymakers to ramp up graduation requirements in several ways—by aligning high school tests with the placement exams students take when they get to college, and by requiring students to complete a full college-prep course sequence, including four math classes that extend at least through Algebra II.

The goal is to have all students demonstrate that they are prepared for college in order to earn a high school diploma, a goal that would have been met with incredulity as recently as ten years ago. Since 2001, eight states and Los Angeles, the second-largest school district in the nation, have decided to begin requiring students to complete such a college-prep course sequence.

Rigor and Relevance

Many educators are concerned that raising graduation standards would increase dropout rates. Indeed, there is a widespread belief that the only way to increase graduation rates is to lower the academic bar, trading rigor for relevance in the curriculum. "We've cut out enough [elective] courses for kids who are not college-bound," Donna Haschke, the president of the Texas State Teachers Association, told *Education Week* in 2005. "We still have concerns about the number of dropouts...Elective courses are the ones that keep them in school."[35]

The evidence is mixed. A recent international study by Cornell University professor John H. Bishop found a positive association between the number of students in career and technical education and high school completion rates.[36] Score one for relevance. But other research suggests that focusing the high school curriculum on core academic subjects raises graduation rates. For example, Valerie Lee's research shows that, other things being equal, high schools that offer a "constrained curriculum"—meaning more academic courses and fewer general-track, remedial, and elective courses—have *lower* dropout rates: "This finding flies in the face of those who say that high schools must offer a large number of non-demanding courses in order to keep uncommitted students in school."[37]

Reformers more and more are thinking that the answer lies somewhere in the middle—in a combination of rigor and relevance. Johns Hopkins University researchers recently found that enrollment in career and technical education is positively associated with higher graduation rates, but *only* when the tech courses are taken along with more challenging academic courses. The ideal ratio appears to be one to two: one career or technical course for every two academic courses.[38]

Higher Expectations

As counterintuitive as it may be, low-achieving students do not appear to suffer from taking tough, college-prep courses. When the Southern Regional Education Board tracked over 3,000 students from middle school into high school several years ago, it found that low-achieving eighth graders were *less likely* to earn D's and F's—a good predictor of dropping out later on—if they enrolled in college prep courses rather than "easier" academic classes.[39]

The San Jose Unified School District had a comparable experience. Five years ago, it became one of the first large districts in the nation to require seniors to complete a full college prep course sequence in order to earn a diploma. Since then, the number of San Jose graduates completing the full "A-G sequence"—a set of courses Californians must

complete to be eligible for admission to the state's two public university systems—has nearly doubled.

At the same time, district officials say that classroom grades are up, and the state reports that San Jose's graduation rates have *increased* slightly even as the California average declined.[40] Those results figured prominently in a successful grassroots campaign to get a similar policy enacted in Los Angeles last year.

Yet perhaps the most compelling evidence on the question of graduation requirements and graduation rates comes from Chicago.

As part of a major initiative to overhaul the city's high schools, Chicago in 1997 raised its graduation standards to well above Illinois' statewide standards. Beginning with entering freshmen in 1997-98, students were required to complete the courses necessary for entry to competitive state universities—four years of English, three years of math (including algebra, geometry and advanced algebra/trigonometry), three years each of social studies and lab sciences, and two years of foreign language.[41]

Many worried that the graduation requirements would push students to drop out, and that coupled with the state's strict accountability for test scores, it might cause educators to turn a blind eye to drop-outs or even encourage low-achieving students to drop out.

But those concerns turned out to be unfounded: Graduation rates *improved* over the next few years. An analysis by the Chicago Consortium on School Research found that most of the improvement was due to higher levels of preparation among entering ninth graders—the result of K-8 reforms. But a small part was driven by the new graduation requirements themselves. They encouraged freshmen and sophomores to take and complete more courses, and students who accumulated more credits early in high school were more likely to earn on-time diplomas.[42]

Many educators are also very worried about the trend toward standardized exit exams for high schools. They are concerned that high-stakes tests will discourage low-achieving students from sticking with high school. A widely cited 2003 *New York Times* article presented a more ominous scenario, offering a slew of anecdotal evidence that educators are "pushing out" low-performing students in order to pump up schoolwide passing rates.[43] But the two most sophisticated recent studies on the issue—both of which used statistical controls and tracked graduation rates as testing policies changed over time—do not support the push-out theory. They offer strong empirical evidence that exit exams do not *necessarily* increase dropout rates.[44]

Those studies have settled the question for some researchers and reformers. Jay Greene, an analyst at the conservative Manhattan Institute, and the co-author of one study, now calls the push-out phenomenon a myth, writing that "our first intuitions simply do not correspond to the evidence. The highest quality research available shows no relationship between adopting an exit exam and graduation rates."[45]

Other researchers, however, say the jury is still out. Most current exit exams still test fairly low-level skills, they say, and nobody can predict with absolute certainty whether graduation rates will suffer if states introduce a new generation of much tougher exit exams tied to college entry standards.

Coursetaking and Student Achievement

A large body of research has found that taking more rigorous courses can improve students' achievement during high school and lead to success in higher education. In 1999, Clifford Adelman, a U.S. Department of Education researcher, published an analysis showing that "the academic intensity and quality of one's high school curriculum (not test scores, and certainly not class rank or grade point average) counts most in preparation for bachelor's degree completion."[46]

Adelman's finding soon became a rallying cry among reformers, and several more studies have since confirmed the power of taking challenging courses. Edward Warburton, Rosio Bugarin, and Anne-Marie Nunez, the authors of a study on college outcomes among young people whose parents do not have college degrees, found that, "after holding all other variables constant, students who took rigorous coursework in high school significantly increased their chances of staying on the persistence track to a bachelor's degree in college."[47] And a February 2006 U.S. Department of Education study by Adelman confirmed that the quality and rigor of high school courses remains the biggest predictor of college completion.[48]

Even *low-achieving* students benefit more from being placed in challenging courses than in easier ones. A study by Adam Gamoran and Eileen Hannigan at the University of Wisconsin-Madison, for example, found that students of all achievement levels had higher learning gains between eighth and tenth grade when they took algebra instead of general math courses.[49]

Yet other research has contributed an important caveat to such findings: Enrollment in advanced high school courses *alone* does not guarantee academic success. The pay off comes only when such courses are taught by capable teachers who challenge their students.

Consider Chicago's experience. Despite the city's 1997 decree that students must take high level courses to graduate from high school, the *Chicago Tribune* in 2005 published a devastating article on the dismal preparation of the city's public school students entering area colleges. The paper found that more than 60 percent of freshmen failed the placement test in English and had to take a remedial course in the subject at the seven campuses of the City Colleges of Chicago. About 70 percent failed the writing test and over 90 percent failed the math test.[50]

Similarly, the Illinois Education Research Council (IERC) reported in 2005 that the level of college preparedness—as measured by the ACT exam—is much lower among Chicago public high school students than among those who attend school elsewhere in Illinois, even though the city's graduation standards are much tougher than the statewide requirements.[51]

Another IERC study didn't dispute Adelman's basic finding on the benefit of advanced courses to low-achieving students like Chicago's, but it made clear that the value of high-level courses to Chicago students was much diminished if they were taught by unqualified teachers, as is often the case in Chicago.[52]

A 1999-2000 study of Chicago high school classrooms by researchers G. Alfred Hess and Solomon Cytrynbaum of Northwestern University revealed just how bad instruction is in many of the city's high schools. "Chicago students were not being asked to do more than regurgitate answers from texts," they reported. "In some classrooms, it was evident that the teachers did not know how to lead students to think more deeply about the matters they were covering, and frequently gave little indication that they had thought more deeply about the subject matter." Still other teachers, they found, believed "their students were incapable of thinking deeply."[53]

"Taking the classes isn't the same as learning the material," says Elaine Allensworth, associate director of the Consortium on Chicago School Research, an organization located at the University of Chicago and founded in 1990 to provide independent analyses of the city's progress in improving its schools.[54]

In other words, "college-prep" courses only prep students for college when the courses are taught by capable teachers who provide a challenging curriculum and motivate students to master the material. Low-income and minority students, research suggests, are least likely to get the good teachers, solid curriculum, high expectations, and intensive support that make higher-level courses pay off.

Part of the problem is that seniority-based staffing and other provisions in collective-bargaining contracts result in mismatches between teacher skills and the courses they are assigned to teach. The Education Trust—West, a research and advocacy organization, in 2005 analyzed whether Los Angeles had enough qualified teachers to provide an "A-G" curriculum for all of the city's high school students. It concluded that, yes, the city had enough qualified teachers, but that the qualified teachers aren't teaching the right classes: "Teachers who are qualified to teach intermediate algebra and geometry are instead teaching pre-algebra and beginning algebra."[55] The district will have to solve that problem if it wants future students to benefit from the higher-level courses it plans to require them to take several years from now.

Putting Tests to the Test

Nearly half the states now require students to pass some kind of test in order to earn a high school diploma, and high school students seem eager to know whether they are adequately prepared for college. The California State University system several years ago augmented existing state tests in English and math to develop an Early Assessment Program for high school juniors. Nearly 70 percent of eligible California eleventh graders *volunteered* to take the math test in 2005.[56] But few states test the skills that students need

to avoid remedial classes in college. And that's a problem. Cornell researcher John Bishop has found that minimum competency exams in math and reading have little or no positive effect on student achievement. The *Boston Globe* reported in May 2005 that 37 percent of public high school students entering Massachusetts colleges and universities still had to take remedial courses—only 2 percentage points below 2002, the year the state's exit exam became a graduation requirement.[57] But the Massachusetts exams, while tougher than many, still have not been fully aligned with standards for college readiness. In contrast, curriculum-based exams used in Europe and some U.S. states—such as the end-of-course exams given in New York and North Carolina—do improve learning and help to reduce the achievement gap between low-income students and their peers.[58]

Getting Students Ready for Rigor

The push for rigorous classroom curricula and tougher graduation requirements has generated increasing concern about the poor academic preparation of many entering ninth graders, particularly in disadvantaged communities. In a study of non-selective neighborhood high schools in Philadelphia, researchers Ruth Curran Neild and Robert Balfanz found that only one in four freshmen had reading skills appropriate for his or her age, and about half read at the *sixth grade level or below*.[59]

Most adolescents can sound out words, but many have poor reading-comprehension skills that make it hard for them to understand the reading materials assigned in academic courses. In response, foundations, the federal government, and many organizations have invested in "adolescent literacy" programs that provide instruction aimed at helping teenagers rapidly acquire the reading skills necessary to handle rigorous coursework. The intent is to replace traditional "remedial" strategies, which slow down the pace of instruction for students who enter behind their peers, with "accelerated" instruction that quickly catches them up and helps them handle challenging college-prep coursework.

The number of such programs has skyrocketed in the last few years. A recent survey by Cynthia Shanahan of the University of Illinois found "what appears to be a burgeoning array of adolescent literacy intervention programs. […] The number and range of programs on or about to appear on the market can make it difficult for a district to choose."[60] The same is not yet true in mathematics, however. While some organizations have begun to create accelerated math interventions, there are far fewer programs available.

Beyond small pilot studies conducted by program developers, little large-scale research on accelerated literacy and math programs has been conducted. The U.S. Department of Education in 2005 contracted with two national research and evaluation firms, MDRC and the American Institutes for Research, to conduct a large-scale evaluation of two popular ninth-grade literacy intervention programs. The evaluation currently is taking place in 34 high schools—all of which use a "small learning communities" structure—across ten school districts. The results won't be available for several years.[61]

So far, the only large-scale evaluation of accelerated "catch up" courses in reading and math appears to be one conducted by Johns Hopkins University researchers affiliated with the University's Talent Development high school model. Ninth graders in Talent Development high schools spend double the amount of time in math and English courses for the entire year—90 minutes in each. During the first semester, they take three classes designed to give them the academic and study skills necessary to handle college prep courses later on—Strategic Reading, Transition to Advanced Mathematics, and Freshman Seminar. During the second semester, teachers follow the district's regular English and Algebra 1 curriculum, supplemented with special materials developed by Johns Hopkins University.

The researchers conducted three studies across multiple high schools in several cities, comparing the achievement levels and gains of students in high schools using the Talent Development courses with those in demographically similar "comparison schools" not using them. They found that students taking the Talent Development catch-up courses significantly outperformed their peers in comparison schools, taking into consideration students' previous achievement levels and their attendance during the school year. Interestingly, students who started out with higher than average achievement seemed to benefit from the courses

too, leading the researchers to conclude that high-poverty urban high schools should consider making such courses standard for all entering freshmen.[62]

Preventing Students from Dropping Out

Research on the dropout problem clearly suggests that graduation rates should improve if reformers are successful in implementing several of the strategies discussed above:

School climate. Two recent studies by Valerie Lee and colleagues found that the high school characteristics promoted by the Gates Foundation's high school initiative substantially reduce dropout rates. Schools have lower dropout rates if they have: smaller enrollments, better interpersonal relationships among students and adults, teachers who are quick to give students extra help when they need it, and a focused and rigorous curriculum.[63] Lee and the University of Maryland's Robert Croninger found that schools with strongly supportive relationships among teachers and students "reduce the probability of dropping out by nearly half." And the benefits are especially great for low-achieving, low-income students.[64]

Improving the climate for ninth graders alone can make a difference. A study by Kerri Kerr of the RAND Corporation and Nettie Legters of Johns Hopkins University found that Maryland high schools using a "schools within a school" strategy or a team teaching approach for ninth graders "showed substantial improvements on promotion, dropout, and achievement outcomes between 1993-94 and 1999-2000."[65]

Rigorous and Relevant Curriculum. Lee and University of Michigan colleague David Burkham found that high schools offering a "constrained curriculum"—more academic courses and fewer general-track or elective courses—in mathematics have lower dropout rates: Schools that offered fewer math courses below the level of algebra I reduced the odds of dropping out by 28 percent, and those that offered calculus reduced the odds by 55 percent.[66] However, as discussed above, research also suggests that high school educators who find the right balance between relevance and rigor in the curriculum will encourage even more students to stay in school and graduate.

Preparing Students for Rigor. Catch-up courses for struggling ninth graders also significantly reduce dropout rates. Students who enter high school poorly prepared are more likely to fail ninth grade, and students who fail ninth grade are far more likely to drop out. The cycle is particularly evident in high-poverty urban high schools. One Philadelphia study found that 43 percent of freshmen who entered with math and reading skills below the seventh-grade level failed ninth grade, compared with only 18 percent of those with at least eighth-grade skills. Another study found that 60 percent of the students who failed ninth grade also failed to graduate, compared with less than 12 percent of those who made it through freshman year.[67]

An increasing number of states and districts also are pursuing more targeted strategies specifically focused on "dropout prevention," including giving extra attention to students identified as being at greater risk of dropping out. But many researchers downplay the value of one popular approach—activities outside the regular school day that are targeted at individual students, such as homework help, counseling, or classes intended to bolster self-esteem and leadership skills. Several highly sophisticated, large scale evaluations of federally-supported dropout prevention initiatives have found that such "supplemental" programs generally do not work. Says Mark Dynarski of Mathematica Policy Research, Inc., the author of one such study: "Supplemental programs had almost no impact on student outcomes. None of the programs affected the dropout rate, and average student grades, test scores, and attendance were similar among treatment- and control-group students."[68]

That's not to say individual interventions can never produce positive results. But to do so, research shows, they must be very intensive. A program called Check & Connect, an intervention developed in the late 1990s by a group of University of Minnesota researchers and local educators with support from the U.S. Department of Education, has demonstrated promising results in several studies. Check & Connect relies on frequent, systematic monitoring of student "warning signs"—such as absenteeism or disciplinary problems—and timely interventions to produce gains in attendance, educational engagement and, ultimately, graduation.[69]

Combining Reforms

But most researchers contend that only intensive, pervasive *institutional* reforms can significantly improve graduation rates in the nation's most troubled high schools: "High schools with high dropout rates need to be directly targeted and radically reinvented if they are going to see substantial improvement," conclude Robert Balfanz and Nettie Legters, researchers at Johns Hopkins University.[70]

Importantly, the dropout problem is very unevenly distributed across the nation's high schools. Balfanz and Legters report that 2,000 high schools—about 15 percent of the nation's total—produce half of the nation's dropouts. Those "dropout factories" are primarily located in the country's 50 largest cities and in cities and small towns across the south and southwest. They disproportionately enroll low-income and minority teenagers.[71]

Results from a rigorous evaluation of the Talent Development model released by MDRC in 2005 suggest that even such severely challenged high-poverty schools can improve ninth-grade promotion and on-time graduation rates if they "layer on" overlapping reform strategies. Talent Development reshapes ninth grades into small, highly supportive learning communities called "Success Academies," in which students take the program's intensive "double dose" periods of accelerated math and literacy courses that lead into college-prep courses. Those courses, as well as a "freshmen seminar" course to enhance study skills, are based on a common curriculum, and Johns Hopkins provides teachers with a great deal of training and support for teaching it.

In Philadelphia, a group of neighborhood high schools replicating Talent Development have seen substantial improvements in several successive waves of ninth graders. "In a [Philadelphia] high school of 500 first-time ninth-graders, Talent Development adds about nine days of school attendance for each student and helps an extra 125 students pass algebra, an extra 40 students achieve promotion to the tenth grade, and an extra 40 students graduate on time," evaluators concluded.[72]

Researchers believe that the Talent Development model gets results because it addresses the academic and human sides of school reform simultaneously. The recent evaluation of the program by MDRC noted that Talent Development's strong positive impacts seem to come from implementing prescriptive strategies for upgrading curricula and improving teaching, at the same time high schools are broken into smaller, more personal learning communities.[73] But the MDRC study also revealed how difficult solving the dropout problem is going to be. Researchers found that the Talent Development model had far less success for ninth graders who already had repeated a grade. "Even in a Talent Development school," evaluators cautioned, "a typical ninth-grader will still miss about 40 days of school, nearly a third will not be promoted to the tenth grade, and more than half will not be ready to graduate within four years. Even successful interventions like Talent Development…need much more power."[74]

Balfanz and Legters contend that in districts with the least-prepared ninth graders and the worst dropout problems, middle schools must be made part of the high school improvement agenda: "High school reform must ultimately be seen as part of a broader secondary school-reform movement," they write.[75]

A Further Agenda

Recent research and experience suggests that the high school reform movement faces three major challenges.

Making Rigor Relevant

Most teachers have been left to their own devices to combine rigor and relevance in classroom instruction, and, as the AIR/SRI evaluation of the Gates high school reform effort documented, they clearly are clamoring for help. A number of researchers agree that they need it. Anthony Carnevale, an economist at the National Center for Education and the Economy and one of the nation's leading experts on the relationship between education and the workforce, argues that high school reformers must help teachers deal with what he calls "curriculum mismatch." The traditional academic curriculum taught in most "college prep" tracks does help students develop general math and verbal reasoning skills that are valuable for today's workplace, Carnevale argues. "Success in the traditional academic curriculum, especially mathematics, is the most powerful predictor of wage advantages," he wrote in a 2005 paper.[76]

But Carnevale points out that the traditional academic curriculum evolved as a way to train future academics, and might not be the only way, or the best way, for all students to develop those skills. He calls for a new kind of curriculum that integrates traditional academic knowledge and skills with "applied competencies" that adults actually use on the job.

That is far too big a job for high school teachers to tackle in their spare time. **Clearly, some organization with sufficient resources and good connections to both the K-12 and business community (perhaps the Office of Vocational and Adult Education in the U.S. Department of Education) should step forward and undertake what might be called an "R-Squared Curriculum Project"—an initiative to develop model curricula or replacement units that infuse workplace applications and problems with rigorous academic content.** The project might begin with mathematics and involve representatives from business and trades—such as the director of electrician apprenticeship program quoted above—alongside educators and curriculum specialists.

Truth-in-Labeling

Neither bottom-up school redesign strategies nor top-down policies to raise graduation requirements have had much success ensuring more effective and more challenging teaching. **Many states are developing end-of-course standards and assessments to help deal with the problem, and that is a good start. But tackling the problem will also require other tools, including model or mandatory curricula, classroom benchmark assessments, curriculum-driven professional development, and elements common to the kind of instructional management systems some urban districts have used to improve elementary education. States or districts that choose not to require a mandatory classroom curriculum should consider at least providing "replacement units" and "anchor assignments"—smaller chunks of standardized curriculum that can help teachers make sure their teaching is aligned with high academic standards.**

Moreover, the toolbox should include methods of auditing high school curriculum content so that administrators can identify problems across classrooms and district officials can identify problems across schools. As Jean Rutherford of the National Center for Educational Accountability puts it, "While truth-in-labeling practices in the food industry ensure that orange drink cannot be labeled orange juice without legal ramifications, schools have no such safeguards in place. Algebra I can be placed on any child's transcript without any guarantee about the content taught or learned."[77]

Research clearly shows that such efforts should pay particular attention to equity in access to rigorous course content for low-income and minority students. If such students don't derive the full benefit of top-down and bottom-up efforts to improve preparation for college and work, the current high school reform movement will abet rather than abate social and economic disparities.

The 15-percent Solution

Few policymakers understand how unequally distributed the dropout problem is among the nation's high schools, or the extent to which highly intensive and targeted solutions will be necessary to solve the problem in the nation's 2,000 dropout factories.

Balfanz of the Talent Development team suggests that the federal government take the initiative to "fix the 15 percent of American high schools that produce 50 percent of the nation's dropouts."[78]

The challenges facing these high schools are daunting: In many, the majority of entering freshmen arrive several grade levels behind and end up failing ninth grade. Stricter accountability is not the answer for these schools, Balfanz says. "You're asking failing schools, many of which have already been targeted under state accountability systems, sitting on watch lists and reconstitution lists for more than a decade, to suddenly begin graduating nearly all freshmen with college-ready skills."[79]

He estimates that would take about $1.5 billion a year to help such schools adopt strategies that have shown to be effective in Talent Development and other models—the same amount of additional funding the Bush Administration requested for its own high school initiative in its fiscal 2006 budget. The initiative also could include funding for a large-scale research and development project using scientifically based methodologies to learn more about which reforms work best under what circumstances, helping to build an even better set of solutions that will benefit all high schools.

So far, the federal government is the only major player left out of the current high school reform movement. The White House made major high school reform proposals both last year and this, but the Administration's focus on expanded testing has failed to garner much Congressional support. **A proposal that would pay for capacity-building in high poverty high schools, rather than yet more accountability, could help the White House gain back some credibility with powerful Democratic legislators. The proposal should have bipartisan appeal, since most congressional districts would get some funding, and a significant number of "dropout factory" high schools are located in the South and Southwest, which means funding would go to districts in "red states" as well as cities in the northeast.**

Conclusion

The current research on high school reform suggests two very powerful conclusions:

First, the American high school is not as impervious to change as many believe it to be. Both real change and real progress are possible, slow and difficult though they may be.

Second, the most significant improvements in high schools come from *combining* strategies and solutions long thought to be ideologically disparate or even mutually exclusive. Research suggests that more rigorous curricula and tougher graduation standards might not hurt graduation rates, and might even help improve them. Rigor and relevance are not zero sum tradeoffs, but actually work best in combination. Structural reforms and curriculum reforms are mutually reinforcing and produce larger gains in student performance when implemented together. Helping educators become more supportive of students, rather than merely indifferent to their success or failure, is critical, but doing so produces more significant improvements in student learning when combined with high expectations and rigorous instruction.

Leaders of the 2005 National Education Summit on high school reform in Washington, D.C. were right to put aside ideological differences over rigor versus relevance and other reform strategies. The research evidence is increasingly clear that reforming high schools requires overlapping solutions.

The challenge now becomes how to create the conditions that allow such solutions to flourish together and how to get them into the communities and high schools that need them the most. High school reform is achievable, but reformers must leave very little to chance to be successful.

Endnotes

[1] J. P. Greene and M. A. Winters, *Public High School Graduation and College Readiness Rates* (New York: Manhattan Institute for Policy Research, February, 2005). The rate does not include students who graduate later than expected or who earn a non-standard diploma such as the General Equivalency Diploma (GED).

[2] National Center for Education Statistics, *Digest of Education Statistics 2004,* published online at: http://nces.ed.gov/programs/digest/d04, data is from Table 137: http://nces.ed.gov/programs/digest/d04/tables/dt04_137.asp (United States Department of Education, 2005).

[3] J. P. Greene and M. A. Winters, *Public High School Graduation and College Readiness Rates* (New York: Manhattan Institute for Policy Research, April, 2005).

[4] M. Perie, R. Moran, and A. D. Lutkus, *NAEP 2004 Trends in Academic Progress: Three Decades of Student Performance in Reading and Mathematics* (Washington, D.C.: USDOE, National Center for Education Statistics, Government Printing Office, 2005).

[5] E. Allensworth and J. Q. Easton, *The On-Track Indicator as a Predictor of High School Graduation* (Chicago: Consortium on Chicago School Research, 2005): 8.

[6] An online version of the report can be found at http://www.ed.gov/pubs/NatAtRisk/findings.html.

[7] T. Toch, *In the Name of Excellence: The Struggle to Reform the Nation's Schools, Why it's Failing and What Should be Done* (New York: Oxford University Press, 1991): 272.

[8] These findings come from over a dozen published research studies. However, a useful recent summary can be found in V. E. Lee, "Important Issues for Research on High Schools" (2005). Paper presented at "Research on Improving High Schools: A Forum for Advancing the Research Agenda" in Washington, D.C., on May 5, 2005.

[9] Brand new schools based on specific designs were compared both with their original "model schools" and with traditional, comprehensive high schools. High schools that had been "redesigned" into clusters of small learning communities were compared with a sample of schools that had been surveyed prior to being redesigned.

[10] The National Evaluation of High School Transformation, *Creating Cultures for Learning: Supportive Relationships in New and Redesigned High Schools* (Washington, D.C.: American Institutes for Research April, 2005): 42.

[11] The National Evaluation of High School Transformation, *Executive Summary: Evaluation of the Bill & Melinda Gates Foundation's High School Grants* (Washington, D.C.: American Institutes for Research 2005): 4.

[12] The National Evaluation of High School Transformation, *Creating Cultures:* 45.

[13] See, for example, D. D. Ready, V. E. Lee, and K. G. Welner, "Educational Equity and School Structure: School Size, Overcrowding, and Schools-within-Schools," *Teachers College Record, 106* (October, 2004): 10. The authors found that "to varying degrees subunit choice permitted students to sort themselves based on their race, social class, academic backgrounds, and aspirations. Parallels to the stratification common to tracked high school curricula were striking. Academically motivated students tended to select subunits with reputations for academic rigor, while struggling students often chose subunits they thought had low academic and behavioral expectations. Moreover, some subunits were designed to attract certain types of students, including those with math or science themes and those with traditional vocational themes." (page 2007).

[14] The National Evaluation of High School Transformation, *Rigor, Relevance, and Results: The Quality of Teacher Assignments and Student Work in New and Conventional High Schools* (Washington, D.C.: American Institutes for Research 2005): 43.

[15] The National Evaluation of High School Transformation. (2005). *Rigor, Relevance*: 51 and 56. The percentages refer to student work samples judged to have the lowest of four levels of quality. The four levels were: "substantial," "moderate," "limited," and "little or none."

[16] The National Evaluation of High School Transformation, *Executive Summary*: 8.

[17] The National Evaluation of High School Transformation, *Executive Summary:* 8.

[18] Quote is from Vander Ark's foreword to T. Wagner, R. Kegan, L. Lahey, R. W. Lemmons, J. Garnier, D. Helsing, A. Howell, H. T. Rasmussen, *Change Leadership: A Practical Guide to Transforming Our Schools* (San Francisco, CA: Jossey-Bass, 2006): xiii.

[19] V. E. Lee, "Important Issues"*:* 13.

[20] A. P. Carnevale, "Connecting the Dots Between High School, Postsecondary Education and Training, and Careers,": 24. Paper presented at "Research on Improving High Schools: A Forum for Advancing the Research Agenda" in Washington, D.C. on May 5, 2005.

[21] D. Helfand, "A Formula for Failure in L.A. Schools," *Los Angeles Times*, January 30, 2006.

[22] Quoted in E. Robelen, "Gates High Schools Get Mixed Review in Study," *Education Week* (November 16, 2005).

[23] J. Quint, H. S. Bloom, A. R. Black, and L. Stephens, *The Challenge of Scaling up Educational Reform Findings and Lessons from First Things First* (New York: MDRC, 2005). Overview.

[24] J. Quint, H. S. Bloom, A. R. Black, and L. Stephens, *The Challenge:* 20.

[25] See http://www.earlycolleges.org.

[26] K. K. Manzo, "Advanced Placement Courses Cast Wider Net," *Education Week* (November 3, 2004).

[27] The College Board, *Advanced Placement report to the nation*, (New York: 2006): 5.

[28] B. Kleiner and L. Lewis, *Dual Enrollment of High School Students at Postsecondary Institutions: 2002–03* (Washington, D.C., USDOE, NCES, Government Printing Office, 2005–008). See also T. Waits, J. C. Setzer, and L. Lewis, *Dual Credit and Exam-Based Courses in U.S. Public High Schools: 2002–03* (Washington, D.C., USDOE, NCES, Government Printing Office, 2005–009).

[29] D. Viadero, "Scholars Warn of Overstating Gains from AP Classes Alone," *Education Week* (February 15, 2006).

[30] S. J. Ingels, L. J. Burns, X. Chen, E. F. Cataldi, and S. Charleston, *A Profile of the American High School Sophomore in 2002: Initial Results from the Base Year of the Education Longitudinal Study of 2002* (2005). (Washington, D.C.: USDOE, NCES, Government Printing Office, 2005–338): v.

[31] S. J. Ingels, M. Planty, and R. Bozick, *A Profile of the American High School Senior in 2004: A First Look—Initial Results From the First Follow-up of the Education Longitudinal Study of 2002 (ELS:2002)* (Washington, D.C.: USDOE, NCES, Government Printing Office, 2006–348): 6.

[32] Achieve, Inc., and National Governors Association, *An Action Agenda for Improving America's High School* (Washington, D.C., 2005).

[33] Achieve, Inc., *Closing the Expectations Gap 2006* (Washington, D.C., 2006): 6.

[34] K. Carey, *One Step from the Finish Line: Higher College-Graduation Rates are within our Reach* (Washington, D.C.: The Education Trust, 2005): 2.

[35] S. Cavanagh, "Several States Making College-Prep Courses the Default Curriculum," *Education Week* (April 20, 2005): 1, 13.

[36] J. H. Bishop and Ferran Mane, "The Impacts of Career-Technical Education on High School Labor Market Success," *Economics of Education Review* (vol. 23, 2004): 381–402.

[37] V. E. Lee and D. T. Burkham, *Dropping Out of High School: The Role of School Organization and Structure,* Paper presented for conference "Dropouts in America: How severe is the problem? What do we know about intervention and prevention?" Harvard Graduate School of Education, (Cambridge, MA: January 13, 2001): 25.

[38] S. Plank, S. Deluca, and A. Estacion, *Dropping Out of High School and the Place of Career and Technical Education: A Survival Analysis of Surviving High School* (Columbus, OH: National Dissemination Center for Career and Technical Education, 2005).

[39] S. Cooney and G. Bottoms, *Middle Grades to High School: Mending a Weak Link* (Atlanta: Southern Regional Education Board, 2002): 9.

[40] San Jose Unified School District, *Inspiring and Preparing for Success: San Jose Unified's Report to the Community* (San Jose, CA: Fall, 2005). Graduation rates available at California Department of Education's DataQuest web site, http://data1.cde.ca.gov/dataquest/.

[41] That course sequence is a somewhat stricter version of that recommended by *A Nation at Risk*, minus the half credit in computer science.

[42] M. Roderick, E. Allensworth, and J. Nagaoka, *How do we get Large Urban High Schools to Care About Dropout Rates and Will No Child Left Behind Help or Hurt?* Paper prepared for the "Developmental, Economic and Policy Perspectives on the Federal No Child Left Behind Act" conference (Center for Human Potential and Public Policy, Harris School of Public Policy, University of Chicago, May 6, 2004) 37-38.

[43] T. Lewin and J. Medina, "To Cut Failure Rate, Schools Shed Students," *New York Times* (July 31, 2003): A-1.

[44] The studies are 1) R. J. Warren and K. N. Jenkins, "High School Exit Examinations and High School Dropout in Texas and Florida 1971-2000," *Sociology of Education* (April, 2005): 78, 122–143. 2) J. P. Greene and M. A. Winters, *Pushed Out or Pulled Out: Exit Exams and Dropout Rates in Public High Schools* (New York: Manhattan Institute for Policy Research, May, 2004).

[45] J. Greene, *Education Myths: What Special Interest Groups Want You to Believe About our Schools and why it isn't so* (New York: Rowman & Littlefield Publishers, Inc, 2005): 128.

[46] C. Adelman, *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment* (Washington, D.C.: USDOE, Office of Educational Research and Improvement, 1999).

[47] E. C. Warburton, R. Bugarin, and A. M. Nuñez, *Bridging the Gap: Academic Preparation and Postsecondary Success of First-Generation Students* (Washington, D.C.: USDOE, NCES, Government Printing Office, 2001).

[48] C. Adelman, *The Tool Box Revisited: Paths to Degree Completion from High School Through College* (Washington, D.C.: U.S. Department of Education, Office of Vocational and Adult Education, 2006).

[49] G. Gamoran and E. C. Hannigan, "Algebra for Everyone? Benefits of College-Preparatory Mathematics for Students with Diverse Abilities in Early Secondary School" *(Educational Evaluation and Policy Analysis, 22*(3), 2000): 241-254.

[50] J. S. Cohen, "Colleges Find Many Lacking: Students Fall Short in Math, English and Put in Remedial Courses," *Chicago Tribune* (Novermber 20, 2005).

[51]J. B. Presley and Y. Gong, *The Demographics and Academics of College Readiness in Illinois* (Edwardsville, IL: Illinois Education Research Council, 2005). Last August the state increased its graduation requirements too, but the new requirements will not fully go into effect for some time.

[52] J. B. Presley, B. R. White, and Y. Gong, *Examining the Distribution and Impact of Teacher Quality in Illinois* (Edwardsville, IL: Illinois Education Research Council, 2005).

[53] G. A. Hess and S. Cytrynbaum, "The Effort to Redesign Chicago's High Schools: Effects on Schools and Achievement," In V. E. Lee (Ed.), *Reforming Chicago's High Schools: Research Perspectives on School and System Change* (Chicago: Consortium on Chicago School Research, 2002): 36.

[54] Personal interview.

[55] The Education Trust—West, *Preparing LAUSD High School Students for the 21st Century Economy: We Have the Way, but Do We Have the Will?* (Oakland, CA: 2005): 2.

[56] California State University, "More California eleventh-graders volunteer to get 'early signal' of their readiness for college" (Press release. September 20, 2005). Retrieved February 12, 2006, from http://www.calstate.edu/PA/news/2005/EAP05.shtml.

[57] M. Sacchetti, "Colleges Question MCAS Success: Many in State Schools Still Need Remedial Help," *Boston Globe* (June 26, 2005).

[58] J. H. Bishop, *High School Exit Exams: When do Effects Generalize?* (Ithaca, NY: Cornell University Center for Advanced Human Resource Studies, 2005).

[59] R. C. Neild and R. Balfanz, *An Extreme Degree of Difficulty: The Demographics of the Ninth grade in Non-Selective High Schools in Philadelphia* (Paper presented at the annual meeting of the American Sociological Association, 2001).

[60] C. Shanahan*, Adolescent Literacy Intervention Programs: Chart and Program Review Guide* (Naperville, IL: Learning Point Associates, 2005): 2.

[61] See http://www.mdrc.org/project_29_70.html for more details.

[62] R. Balfanz, N. Legters, W. Jordan, *Catching up: Impact of the Talent Development Ninth Grade Instructional Interventions in Reading and Mathematics in High-Poverty High Schools* (Baltimore, MD: Johns Hopkins University April, 2004).

[63] R. G. Croninger and V. E. Lee, "Social Capital and Dropping out of High School: Benefits to At-Risk Students of Teachers' Support and Guidance," *Teachers College Record* (103*,* 2001): 548-581. See also V. E. Lee and D. T. Burkham, *Dropping out.*

[64] R. G. Croninger and V. E. Lee, "Social Capital."

[65] K. A. Kerr and N. E. Legters, "Preventing Dropout: Use and Impact of Organizational Reforms Designed to Ease the Transition to High School," In G. Orfield (Ed.), *Dropouts in America: Confronting the Graduation Rate Crisis* (Cambridge, MA: Harvard Education Press, 2004): 221-242.

[66] Lee and Burkham, *Dropping out.*

[67] Balfanz, Legters, and Jordan*, Catching up*: 2.

[68] Dynarski, M. (2004). "Interpreting the Evidence from Recent Federal Evaluations of Dropout Prevention Programs: The State of Scientific Research," In G. Orfield (Ed.) *Dropouts in America.*

[69] C. A. Lehr, M. F. Sinclair, and S. L. Christenson, "Addressing Student Engagement and Truancy Prevention during the Elementary School Years: A Replication Study of the Check & Connect Model," (*Journal of Education for Students Placed at Risk,* 9 (3), 2004): 279-301.

[70] R. Balfanz, and N. Legters, "Locating the Dropout Crisis: Which High Schools Produce the Nation's Dropouts?" In G. Orfield (Ed.), *Dropouts in America*: 72.

[71] Balfanz and Legters, *Locating the Dropout Crisis.*

[72] J. J. Kemple, C.M. Herlihy, and T. J. Smith, *Making Progress Toward Graduation: Evidence from the Talent Development High School Model (*New York: MDRC, May, 2005): ES-8.

[73] J. J. Kemple, C.M. Herlihy, and T. J. Smith, *Making Progress*: iii.

[74] Kemple, Herlihy, and Smith, *Making Progress:* ES-8.

[75] Balfanz and Legters, *Locating the dropout crisis*: 77.

[76] Carnevale, *Connecting the Dots.*

[77] Quoted in J. Dounay, *Ensuring Rigor in the High School Curriculum: What States are Doing*. (Denver: Education Commission of the States, January, 2006).

[78] Personal interview.

[79] Personal interview.

A Look at High School Reform

Introduction

Pleas, declarations, and initiatives for the reform of American high schools are coming from all sectors of society. While many efforts at reform have been and are being implemented, the breadth and intensity of such efforts are on a sharply upward trajectory.

Businesses increasingly want and need a well-trained workforce. Economists emphasize that the U.S. must have the human capital to compete and lead in the global marketplace. Institutions of higher education are searching for ways to expand postsecondary education opportunities for students of all races and classes, as they move away from affirmative action and toward systems that stress merit and academic achievement. States and the federal government would like to redress the drain on resources that accrues from students having to take remedial courses to master the basics they should have learned prior to college. Advocates are working to rectify the inequities in the quality of secondary education offered to students from varied races and socioeconomic backgrounds.

In late February of last year, the nation's Governors (NGA) and ACHIEVE convened a national summit entitled *Redesigning the American High School* (Olson, 2005). The Summit's keynote speaker, Bill Gates, is investing millions of dollars in creating small schools and other innovations intended to improve high school education. According to Gates, "Training the workforce of tomorrow with the high schools of today is like trying to teach kids about today's computers on a 50-year-old mainframe."

These sentiments coincide with an apparently growing consensus (e.g., the report authored by the politically diverse collaborators of the American Diploma Project, 2004; see also the work of the Stanford Bridge Project by Venezia, Kirst and Antonio, 2004) that students need a similar core set of academic skills, particularly in language arts and mathematics, whether they pursue: a) immediate postsecondary employment; *or* b) a college education.

In addition to the NGA/ACHIEVE efforts, and Gates' work, the reauthorizations of the federal Elementary and Secondary Education Act and the Perkins Vocational Education Act will heighten national interest in these issues.

Overview

History of High Schools in the U.S.

High schools as institutions are relatively new in American culture. Gates has a point: high schools as distinct entities emerged in the late 19th century as the country was

preoccupied with a demand for industrial workers in the manufacturing sector, and, to some extent, agricultural workers and those with specific clerical skills.

One of the central dynamics in debates over high school reform have stemmed at least in part from the changes in the population which high schools have had to serve. In 1900, only one in ten of those aged fourteen to seventeen was enrolled in high school. By 1940, seven in ten were (Tyack & Cuban, 1995). The current figure is close to 90%. Similarly, while current graduation rates are lamented, in 1900, only 8% of all students graduated high school. The current figure is in the mid to high seventies, depending on the method used to measure it (Tyack & Cuban, 1995).

From over a century ago until today, debates about the role, shortcomings, and potential strengths of American high schools are remarkably similar. The crux of these debates occupy two poles of the spectrum familiar to most readers, and one that runs throughout the topics covered in this prospectus: 1) high schools as a bastion of an egalitarian ideal where all students are held to high academic standards to prepare them for postsecondary education and citizenship; 2) high school schools as a series of tracks – from vocational to academic - differentiated by student abilities and motivations.

Interestingly, in 1893, what is probably the first "blue ribbon" report on high school reform (The Committee of Ten, chaired by Harvard President Charles William Elliot), not unlike the NGA/ACHIEVE and Bill Gates, emphasized the need for rigorous academic training and preparation for college for *all* students, despite the relatively already "elite" population that attended high school at the time.

A quarter of a century later, in 1917, another blue ribbon panel of reformers, in a report entitled "Cardinal Principles of Education," reached starkly differing conclusions. It emphasized the necessity for high schools to attend to the needs of students who would not be attending college. Dubbed a "social efficiency" model, it emphasized focusing reform efforts on those assumedly incapable of and/or uninterested in an academic education and grounded its assumptions on the demands of an industrial society.

In this case, it didn't take long for the federal government to react. One of the first forays of the federal government into secondary education occurred in 1917 with the passage of the Smith-Hughes Act. The Smith-Hughes Act provided federal funding for agricultural, domestic science, and industrial education programs in the high schools, and for the college-level preparation of teachers in these subjects (Tanner & Tanner, 1980). Thus, the thrust of the Act was pragmatic: specific training in industry–based skills relevant to the early 20th century economy.

In the agricultural age, postsecondary education was a pipe dream for most Americans.
In the industrial age, it was the birthright of only a few.
By the space age, it became common for many.
Today, it is just common sense for all.

- National Commission on the High School Senior Year, 2001

The Current State of Debate – High School Programs of Study

Changes in the nature of business demands for young workers and concerns for equity have swung the pendulum back toward a call for reform efforts that hold all students to high academic standards that will prepare them for both entry into the workforce and/or postsecondary education.

The reasons are several. First, there is widespread agreement (ADP, 2004; Venezia et al. 2004) that high schools are falling far short in facilitating high school completion and providing students with the skills they need to succeed in college and/or the workforce. This coincides with an apparently growing consensus (ADP, 2004; Venezia et al., 2004) that students need a similar core set of academic skills whether they pursue: a) immediate postsecondary employment; *or* b) a college education. These studies argue for a "K-16" model of education that involves cooperation between elementary and secondary education systems, institutions of higher education, and employers.

Intertwined with these issues is a growing awareness about the inequities of opportunities offered to poor and minority students with regard to the rigor of courses available and the distribution of highly qualified teachers.

The NRC has adeptly captured these two dynamics in a recent report. The NRC report on Advanced Placement and (AP) International Baccalaureate (IB) programs (NRC, 2002b) -- two of the most established approaches to rigorous, advanced high school curriculum -- notes three key points: 1) minorities and low-income students are much less likely to have access to rigorous courses; 2) teachers have substantial leeway in implementing AP and IB courses, raising issues of varying quality and effectiveness; 3) validity for assessing student understanding and acquisition of knowledge from AP and IB courses is lacking and in many instances such assessments are superficial and narrowly focused.

Higher standards and more rigorous curricula are moot if students do not successfully negotiate the normative transition from junior high or middle school to high school. Research indicates that this transition presents especially significant challenges. In general, it is associated with increased absenteeism, decreases in grade point averages, and declines in extra-curricular activities (Felner, Primavera, and Cauce, 1981). Low grades and poor attendance have been found to be strong predictors of future high school failure and drop-out (U.S. Department of Health, Education, and Welfare, 1975). Thus, the high school transition is a pivotal point for ensuring that students remain in school and engaged in their academic studies.

THREE STRATEGIES: EARLY HS REMEDIATION, SCHOOL STRUCTURE REFORMS, AND ENHANCING TEACHER QUALIFICATIONS

Early High School Remediation. Remediation of learning deficits at the college level has been the object of widespread discussion (ADP, 2004; Venezia et al, 2004). The majority of high school graduates require remedial coursework in college. While upwards of 70 percent of high school graduates immediately enter two- and four-year

colleges, at least 28 percent immediately take remedial English or math courses. During their college careers, 53 percent of students take at least one remedial English or math class. In the California State University system, 59 percent of its entering students are placed into remedial English or math. The need for remedial help is duplicative and expensive: students and taxpayers wind up paying for coursework that should have been completed in college and which yields no college credit.

In parallel, there has recently been a new push to offer remediation to entering high school students, especially in reading and language arts (Biancarosa and Snow, 2004). Obviously, students cannot engage in high level courses if they have not yet mastered the basics of math and reading, although this point is glaringly absent from most reports calling for universal access to a rigorous high school curriculum. The "Reading Next" report (Biancarosa and Snow, 2004) published by the Alliance for Excellent Education, in conjunction with the Carnegie Foundation, is a refreshing exception. It stresses the need for remedial literacy instruction in high school, with an emphasis on reading *comprehension* grounded in subject area content with frequent formative assessments focusing on the individual needs of students. The report generally echoes findings of the NRC (NRC, 2000) regarding the science of learning and instruction.

Optimally, students would come to high school with the grade level skills they need to succeed in a challenging high school curriculum. But the current reality demands that attention be paid to the skills they bring with them, or the lack thereof, so that an individualized program of study can be instituted as soon as reasonably possible to enable students to pursue the rigorous program of coursework recommended by leading experts and policymakers.

School Structure and Organization. Research suggests that a restructuring of the school environment can be effective in reducing the risk for dropout and academic underperformance (NRC, 2002a). Several studies show that increasing peer interaction within a small, stable cohort and strengthening relationships between students and teachers results in increased achievement, lower absenteeism, and improved student engagement (Felner, Ginter, and Primavera, 1982; NRC 2002a).

Creating smaller schools/learning communities have been advocated as a specific reform for improving high school student engagement, achievement, and graduation rates. A small but growing body of evidence indicates that small schools have higher student attendance and graduation rates, retain fewer students in grade, and have fewer disciplinary problems when compared with larger schools serving students from similar backgrounds. These findings offer compelling evidence that small schools do a better job of fostering student engagement and persistence than their larger counterparts (Simmons, 2003). The NRC has weighed in with a recommendation that "districts should restructure comprehensive urban high schools to create smaller learning communities that foster personalized, and continuous relationships between teachers and students" (NRC, 2004).

However, the extant research base is largely based on case studies of start-up schools, often charters. As the NRC report "Engaging Schools" (2004) acknowledges, smaller learning communities are a necessary but not sufficient component of school reform.

Research should revolve around the fact that "learning environment" size is a *distal* variable.

Teacher Qualifications. Out-of-field teaching, long-term use of substitutes, shortages of specialists in math, science, reading, special education, and ESL are pointed to constantly as important and difficult to solve problems (e.g., Ferguson, 1991; Ingersoll, 2002). It's been almost 10 years since the National Commission on Teaching and America's Future published its seminal study in which this was one of several prominent issues.

Teacher quality has been demonstrated to be the most important in-school factor in student achievement. Quality teaching is at the core of all high school reform intervention efforts, especially given the fact that high school teachers are assumed to be "specialists," responsible for delivering content in a particular subject area. As the NRC simply put it, students learn best from teachers with strong content knowledge and pedagogical skills (NRC, 2002). Some of the earliest and best analysis has been done in Tennessee, where researchers found that all else being equal, students assigned to the most effective teachers for three years in a row performed 50 percentile points higher—on a 100-point scale—than comparable students assigned to the least effective teachers for three years in a row.

The No Child Left Behind Act of 2001 (NCLB) set a goal of having all teachers be "highly qualified" by the 2005-06 school year. "Highly qualified" is essentially defined as 1) holding licensure and/or full state certification 2) demonstrating content knowledge, either through passing a test or holding a college major in each subject taught. It is clear this goal will not be met. But when the benchmark comes and goes it is safe to say there will be debate about why states fell short and what can be done to redouble state efforts.

Summary

This paper summarizes some of the more prominent reforms taking place in American high schools. It is by no means an exhaustive list but illustrates the diversity in philosophy and orientation of high school reforms. The research bases for most of these reforms are thin; thus stressing the need for further study about the efficacy of these and other reforms.

References

American Diploma Project (2004). Ready or Not: Creating a High School Diploma That Counts. Washington, D.C.: 2004.

Biancarosa, G., and Snow, C. E. (2004.) Reading Next—A Vision for Action and Research in Middle and High School Literacy: A Report to Carnegie Corporation of New York.Washington, DC: Alliance for Excellent Education.

Felner, R.D., Primavera, J., and Cauce, A.M. (1981). The impact of school transitions: A focus for preventive efforts. American Journal of Community Psychology, 10, 449-459.

Felner, R.D., Ginter, M., and Primavera, J. (1982). Primary prevention during school transitions: Social support and environmental structure. American Journal of Community Psychology, 10, 277-290.

Ferguson, R. (1991) Paying for Public Education: New Evidence on How and Why Money Matters, Harvard Journal on Legislation, 28:2.

Ingersoll, R.M. (2002) Out-of-Field Teaching, Educational Inquality, and the Organization of Schools: An Exploratory Analysis, Philadelphia: University of Pennsylvania.

National Research Council and the Institute of Medicine (2004). Engaging Schools: Fostering High School Students' Engagement and Motivation to Learn. Board on Children, Youth, and Families, Division of Children, Youth, and Families, Division of Behavioral and Social Sciences and Education. Washington, D.C.: The National Academies Press.

National Research Council and Institute of Medicine (2002a). Community Programs to Promote Youth Development. Committee on Community-Level Programs for Youth. Jacquelenne Eccles and Jennifer A. Gootman (Eds.). Board on Children, Youth, and Families, Division of Behavioral and Social Sciences and Education. Washington, D.C.: National Acdemy Press.

National Research Council (2002b) Learning and Understanding: Improving Advanced Study of Mathematics and Science in U.S. High Schools. J.P. Gollub, M.W. Brenthal, & R.R. Cocking (Eds). Commission on Behavioral and Social Sciences and Education. Washington, D.C.: National Academy Press.

National Research Council (2000). How people learn. J.D. Bransford, J.P. Labov, & P.C. Curtis (Eds.). Center for Education, Division of Behavioral and Social Sciences and Education. Washington, D.C.: National Academy Press.

Olson, L. (February 28, 2005) State Leaders Pledge to Reform Nation's High Schools Washington, D.C.: Education Week.

Simmons, W. (2003). Small schools: From promise to practice. Voices in Urban Education. Providence, Rhode Island: Brown University. Available at: http://www.annenberginstitute.org/VUE/fall03/Simmons.html.

Tanner, D., & Tanner, L. (1980). Curriculum development: Theory into practice. New York: Macmillan.

Tyack, D. & Cuban, L. (1995). Tinkering Toward Utopia. Cambridge, MA: Harvard University Press.

U.S. Department of Education (2001) National Commission on the High School Senior Year, Raising Our Sights: No High School Senior Left Behind, Washington, D.C.

U.S. Department of Health, Education, and Welfare (1975). Dropout prevention. Washington, D.C.: Educational Resources Information Center.

Venezia, A., Kirst, M.W., & Antonio, A.L. (2004). Betraying the College Dream**:** How Disconnected K-12 and Postsecondary Education Systems Undermine Student Aspirations. Stanford, CA: The Stanford Institute for Higher Education Research.

NATIONAL CENTER FOR EDUCATION STATISTICS

Working Paper Series

High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates

An Examination of Data from the National Education Longitudinal Study of 1988

Working Paper No. 98-09 August 1998

Contact: Jeffrey Owings
Schools and Families Longitudinal Studies Program, DDLSG
(202) 219-1777
email: jeffrey_owings@ed.gov

U. S. Department of Education
Office of Educational Research and Improvement

High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates

An Examination of Data from the National Education Longitudinal Study of 1988

Prepared by:

Valerie E. Lee, David T. Burkam, Todd Chow-Hoy,
Becky A. Smerdon, and Douglas Geverdt
University of Michigan

Prepared for:

U.S. Department of Education
Office of Educational Research and Development
National Center for Education Statistics

August 1998

The research that resulted in this study was supported by the School and Family Longitudinal Studies Program of the National Center for Educational Statistics (NCES), U.S. Department of Education, through a task order contract administered through MPR Associates, Berkeley, California. The data used in this study, the High School Effectiveness Supplement to the National Education Longitudinal Study of 1988, are available to researchers holding a license to use confidential data through NCES. The study's first author holds such a license (control number 912050011E). We appreciate assistance with the early part of the work from Karen Ross, as well as advice from NCES staff members Bob Burton and Jeffrey Owings, Director of the School and Family Longitudinal Studies Program, and from Ellen Bradburn of the Education Statistics Services Institute.

Preface

In this study, the authors investigated how the structure of the high school curriculum influences how far graduates get in the secondary mathematics course pipeline and their level of achievement in that subject by the end of high school. The study draws on data from the High School Effectiveness Supplement (HSES) of NELS:88, a broad-based longitudinal study of U.S. adolescents' experiences and accomplishments in public and private secondary schools in and around our nation's 30 largest cities, as well as from the students' high school transcripts. Data are available from the U.S. Department of Education through its National Center for Education Statistics. Using a two-stage stratified sample of 3,430 high school students in 184 high schools, the study used the Hierarchical Linear Models (HLM) statistical software to estimate school effects on individual students' behaviors and achievement.

The authors found that completing high-level mathematics courses is strongly associated with students' achievement. However, how schools structure their mathematics curricula influences how far their students get in the math course pipeline. Students who attend schools where more credits are accumulated in low-level mathematics courses make less progress to the more advanced courses. Curriculum structure—the types and numbers of mathematics courses offered and taken—has both a direct and an indirect effect on students' achievement in that subject. Implications of curriculum structure for students' academic progress are discussed.

Table of Contents

List of Figures

List of Tables

High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates

The publication of *A Nation at Risk* (National Commission on Excellence in Education 1983) jolted the public into critical scrutiny of the American high school. How best to organize a high school to maximize what its students actually learn increasingly has engaged policymakers, educators, and researchers since that time. These examinations have found wanting almost all aspects of high schools (for critiques, see Boyer 1983; Goodlad 1984; National Association of Secondary School Principals 1996; Powell, Farrar, & Cohen 1985; Sizer 1984, 1992). Furthermore, a consistent theme of these writings is a call for fundamental change in the structure of U.S. secondary schools.

The study described in this report focuses on an important feature of secondary schools: the curriculum. The study investigates how the structure of the high school curriculum influences the courses students take, how students' academic and social background characteristics are mapped onto their course choices, and ultimately how secondary school curriculum structure influences student achievement. The curriculum of high schools is organized around subject areas: English, foreign language, mathematics, science, social studies, and fine arts. Here we focus on curriculum and achievement in one subject only: mathematics. To maximize the influence of the curriculum on students' academic behavior and performance, we limit our study sample to students who stayed in high school for four years, until graduation.

Background

Conflicting Goals in the High School Curriculum

Any high school's curriculum reflects a formal codification of choices about what knowledge is deemed both worthy of transmission to younger generations and within the capacity of its students to master. Tensions between worth and appropriateness of knowledge embodied in the curriculum leads, in most high schools, to dual goals represented within its structure: differentiation and constraint. Balancing these two goals represents an attempt to form consensus around a set of common understandings and also to address individual differences in students' abilities and interests (Oakes, Gamoran, & Page 1992; Kleibard 1986). *Curriculum differentiation* reflects the diversification approach to this struggle. Here different knowledge is available to different groups of students, based on their aptitudes and tastes. This is part of an underlying dynamic that attaches distinct purposes and missions to the task of educating students within a single high school building. On the other side is a *constrained curriculum* approach, which promotes a belief about the appropriateness of a single set of academic goals for all participants. Under this approach, student choices and options are limited.

The high school curriculum can be constrained through limited opportunity as well as through proactive emphasis on moving students into and through a common set of experiences. Much of the research about this topic is framed within the "student choice"

model: individual students choosing particular courses, and the influence of those choices on achievement. However, another research strand (mostly sociological in nature) has conceptualized the link between coursetaking and achievement as primarily a school, rather than a student, phenomenon. This model assumes that students partake in the curriculum of their school to the extent that it is available, and more subtly to the extent that they are encouraged to do so (Lantz & Smith 1981; Lee & Ekstrom 1987; Useem 1991). If the school offers a modest number of courses, largely academic in nature, these are the kinds of courses students take (Lee 1993). Thus, a constrained curriculum is evidenced both structurally, through the numbers of academic and non-academic options provided students, and behaviorally, through the actual variety of choices students make in carrying out their courses of study in high school.

Historical Background

The comprehensive high school. Before 1900, fewer than ten percent of 14 to 17 year olds were enrolled in secondary schools (Oakes 1985). Such schools were elite college-preparatory academies, with a narrow focus on a limited range of academic knowledge. In the first decades of the twentieth century, enrollment increased dramatically as more of this age group attended school and the U.S. population burgeoned through immigration. Both immigrant and migrant populations flocked to large cities; this movement was accompanied by economic and political shifts to restrict and finally to outlaw child labor (Cremin 1988). In response, secondary schools shifted their missions radically. Not all students who crossed the thresholds of public high schools planned to attend college, or even to stay in school for four years. As the types of students they were to educate diversified, the schools changed their goals and agendas.

Debates over what form the public high school curriculum should take polarized around two alternatives: (1) a common core of courses meant to be appropriate for all, or (2) a diversified set of offerings to accommodate the variety of students. As the debate settled in favor of the latter, the comprehensive high school was born (Conant 1959; Oakes 1985; Tyack 1974). By providing a wide array of options, “high schools would serve democracy by offering usable studies to everyone, rather than dwelling on academic abstractions that would interest only a few” (Powell, et al 1985, p.260). An important objective of the comprehensive curriculum has always been to keep students in school until graduation.

The constrained curriculum. Although similar demographic changes affected almost all high schools in the early years of this century, not all of them (especially non-public schools) abandoned a commitment to rigorous academic training (Kleibard 1986). Because most new immigrants were Catholic, the rapidly expanding Catholic educational system felt the need to accommodate its children. The same vigorous debate about the purposes and methods of high schools that had occurred among public school educators raged among those concerned with Catholic education. Issues of expansion, demographic shift, and curriculum focus were central to the debate among educators in both sectors, but the debate was resolved quite differently in the two settings. Settling on a rationale for a classical curriculum, the Catholic Church argued that developing a student’s ability

to reason was “necessary in order to grasp fully the established understandings about person, society, and God. Although universal secondary education had expanded the base of people to be educated, the purpose of education should not change. Practical education deviated too far from the central moral aims of schooling” (Bryk, Lee, & Holland 1993, p. 31).

Even with rather similar student populations in public and Catholic secondary schools (particularly in the cities, where most Catholic schools have always been located), the high school curriculum in the two sectors diverged. Curriculum in the two sectors has always been based on fundamentally different views about what an appropriate secondary education should be. The comprehensive model currently dominates U.S. public high schools; the narrow academic curriculum still typifies Catholic schools. There are some basic disagreements among educators in the two sectors about whether social and intellectual differences among students are best addressed by diversifying instruction and content. The response to such diversity rests on basic differences about the ultimate aims of secondary education.

Much of the recent research investigating the structure of the high school curriculum has been formulated in cross-sector comparisons. However, one recent study pursued this issue only in public high schools (Lee, Croninger, & Smith 1997). The authors concluded that a constrained curriculum in mathematics has positive effects on high school achievement in that subject. In that study, “constrained curriculum” was measured in several ways: by students taking large numbers of academic courses in mathematics, by a high proportion of the school’s student body being in the college preparatory track, and by the proportion of the school’s total mathematics offerings that are academic. An important aspect of that study was its demonstration of considerable variation in curriculum structure in U.S. public schools. That finding undercuts potential critiques about the validity of cross-sector research that are based on potential selectivity bias as the logical explanation for the prevalence of the constrained curriculum in Catholic high schools.

Curriculum reform in the 1980s. The *Nation at Risk* report spurred some movement away from the diversified curriculum in public high schools in recent years. Efforts to upgrade the curriculum have been a major thrust of educational reform in the last decade, in the direction of more students taking more challenging courses (Clune & White 1992; McDonnell 1988; National Commission on Excellence in Education 1983). Taking academic courses has been identified as a primary determinant of achievement (Gamoran 1987; Jones, et al 1986; Lee & Bryk 1988). This association has provided empirical evidence consistent with this policy objective.

Two enduring educational aims motivate this type of reform of the high school curriculum: (1) U.S. students’ performance on standardized tests (excellence), and (2) unequal educational outcomes associated with students’ social backgrounds (equity). These concerns, and their social and economic implications, have helped shift the proportion of the curriculum that is academic back to levels that were common prior to the 1930s (Angus & Mirel 1995). There is evidence that such reforms, typically

manifested by states and districts increasing graduation requirements, have resulted in students taking more academic courses. However, these reforms have not had the expected result of reducing student coursework in non-academic areas of the curriculum. Rather, students have taken *more* courses altogether (Clune & White 1992).

Unresolved issues regarding curriculum reform. Guided by the dual motivations of excellence and equity, reforms of the last decade have attempted to improve the high school curriculum and students' courses of study. However, fundamental normative issues underlie decisions about curriculum. For example, those who make decisions about curriculum might ask: "What courses should students take in high school?" "Should all students take the same courses?" "What courses should be offered and which should be dropped from the curriculum?" "What criteria should guide schools' decisions about what courses are offered and students' decisions about what courses are taken?" "Should schools guide students in choosing their course of study in high school, or should they leave the choice of courses to students and their families?" Although such questions are not addressed directly in this study, we hope that the results will provide empirical evidence to inform discussions and decisions about the high school curriculum.

A Conceptual Model for Studying Curriculum Effects

Cross-sector comparisons. Our conceptualization of the issue of how high school curriculum structure influences student achievement is rooted in research that compares Catholic and public schools. From the flurry of recent research comparing the effectiveness of schools in the two sectors, a consistent finding concerns the organization of the curriculum. One reason why Catholic school students achieve at higher levels than their public school counterparts, and why achievement there is also distributed more equitably among students of varying backgrounds is the difference in the academic organization of high schools in the two sectors (Bryk, et al 1993; Coleman, Hoffer, & Kilgore 1982; Lee 1985; Lee & Bryk 1988, 1989).

Virtually all students in Catholic high schools, regardless of race, social class, aspirations, or academic preparation, follow close to the same course of study: a narrow set of mostly academic offerings almost all of which are required. The courses that public school students take are more differentiated—they are allowed more choices, and their choices are more strongly associated with their backgrounds. Recent research, within the framework of school restructuring, has added empirical support for the associations between a school's academic organization and both effectiveness and equity (Lee & Smith 1995; Lee, Smith, & Croninger 1997).[1]

The mathematics curriculum. We decided to focus our study of curriculum and achievement on one subject: mathematics. Studies of the effects of tracking and grouping on student performance show the largest and most consistent effects in mathematics (Gamoran 1987; Lee & Bryk 1988). Mathematics is an area of the curriculum where learning is particularly responsive to school experiences (Murnane 1975). In this subject, in terms both of content and task expectations, performance measures more closely approximate the training that students receive in school than other school subjects.

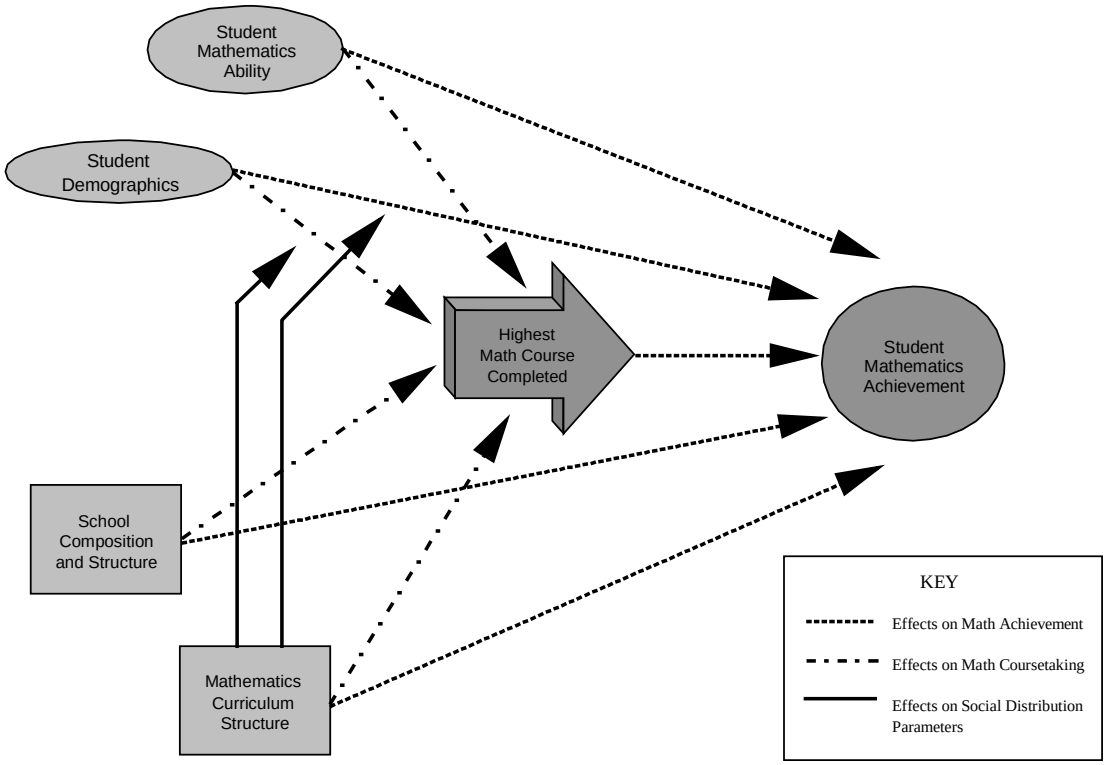
Explanations for this match include a more standardized secondary curriculum in mathematics than in other subjects, heavy reliance on a modest number of widely used texts, and traditional training of mathematics teachers (Romberg 1992). The close alignment between teaching and testing suggests mathematics as a fruitful subject in which to locate a study of the effect on achievement of course offerings, course selections, and other aspects of the structure of the high school curriculum.

In sum, we targeted this subject for several reasons: (1) its linear sequencing, (2) the ability to identify course content by course title (e.g., "Algebra II" has more specified content than "English II"); (3) the differentiation of the curriculum by course level; (4) the recognized importance of mathematical skills for college entry and a wide range of professions; and (5) the fact that it is learned almost entirely in school and not at home (Murnane 1975). A focus on mathematics allows study of the multi-dimensional nature of schools' influence on individuals' achievement: course offerings, school policies, course sequences, student coursetaking, and students' performance in school.

The model. Figure 1 presents the heuristic model that guided our investigation of the effects of curriculum structure on learning. The study's format is hierarchical; students are "nested" in high schools. Therefore, the model incorporates constructs of two types: those that describe *students* (their ability, their demographic characteristics, the courses they complete, and their achievement) and those that describe *schools* (their demographic composition, structural characteristics such as size and sector, and the structure of their mathematics curriculum).

Figure 1 takes the form of a multilevel path model. Characteristics of both students and schools are hypothesized to influence students' decisions about the mathematics courses taken in high school. We hypothesize that coursework, in turn, influences achievement. As described below, we operationalize the construct of coursework with the most advanced course in mathematics that students complete in high school. The path structure of our model means that we may test whether characteristics of students and schools have both a direct and an indirect effect on achievement, with the indirect effect mediated by the coursework students pursue.

Figure 1
Heuristic model for the effects of high-school curriculum structure on mathematics achievement



Source: U.S. Department of Education, National Center for Education Statistics, High School Effectiveness Study (HSES:90/92).

Another feature of the heuristic model shown in figure 1 is that we hypothesize that characteristics of schools (in particular the structure of the mathematics curriculum) influence not only coursework and achievement but also the social distribution of these outcomes. In this model we test whether coursetaking and achievement differ across high schools. Beyond differences between schools on those measures, we also investigate whether there is significant variation between schools in how coursework and achievement are distributed among students within schools according to their social characteristics (in this case, family socioeconomic status). As described below, this study makes use of a statistical methodology—Hierarchical Linear Models, or HLM—that capitalizes on the multilevel nature of the data and the hierarchical nature of the questions.

The research questions. Although there are several sets of relationships investigated in analyses suggested by figure 1, three major research questions drive this study. All three questions are multilevel, and for all three we take into account a substantial set of statistical controls (for students and schools).

> **Research question 1: Coursetaking**. How does the structure of high school mathematics curriculum influence the courses students complete in high school? In investigating this question, we take into account students' social and academic backgrounds, as well as the composition and structural characteristics of the schools they attend.
>
> **Research question 2: Achievement**. How does the structure of the high school curriculum affect students' achievement in mathematics at the end of high school? The analyses that address this question include controls for students' academic and social backgrounds, their high school courses of study, and the demographic and structural characteristics of their high schools.
>
> **Research question 3: Equitable distribution of coursetaking and achievement**. How does curriculum structure influence the relationship between students' socioeconomic status and both the courses they complete and their achievement? These analyses also include controls for other characteristics of students and schools.

For all three questions, we hypothesize that a more constrained mathematics curriculum, where more students complete the same set of high-level courses in that subject and schools offer fewer lower-level courses, is associated with higher levels of academic outcomes. That is, we hypothesize that a constrained curriculum results in students getting farther in the math course pipeline, in higher levels of achievement in mathematics, and in a more equitable social distribution of coursetaking and achievement.

Discussion

Summary of Findings

Observed differences. The number and type of mathematics courses offered and taken in high school are associated with many characteristics of students and schools. In our descriptive analyses, several background characteristics were associated with less progress in the curriculum (being black or Hispanic, being from a lower-SES family, earning lower math grades early in high school, being female). A similar pattern was found for high school curriculum structure. Schools with more minority students, with lower average SES, and with more low-achieving students demonstrate less average progress through the mathematics course pipeline. Average progress also differed by the school structural characteristics of sector (private schools show more progress) and size (students in smaller schools make more progress). However, these analyses did not take account of interrelationships between various background characteristics.

All of the students in this sample stayed in high school until graduation. Comparisons of HSES students who were included and excluded in this study (appendix A) show the excluded sample to be disadvantaged in several respects (e.g., lower SES, lower grades in ninth grade—see appendix table A-1). Those comparisons provide evidence to suggest that the association between background and coursetaking in this study would be even larger if our sample included students who dropped out of high school. Thus, our estimates of such social stratification in these outcomes probably represent a lower bound for the full high school population.

Determinants of students' progress through the high school mathematics curriculum. Individual students' achievement in mathematics is associated strongly with their progress through the mathematics curriculum. Even in multivariate models which take account of students' social background and academic status at the beginning of high school, students' progress in the mathematics course pipeline is the strongest single predictor of their achievement—twice the strength of any other factor.

The association between coursetaking and achievement demonstrated in other research motivated our attempts to identify its determinants. In particular, we wanted to know whether the number and type of courses the school offers influences how far through the standard academic mathematics sequence students get, and ultimately how both these factors influence achievement. Thus, the focus of this study was on the structure of the high school math curriculum and how it influences both students' progress in the mathematics pipeline and also their achievement.

Two features of the high school mathematics curriculum were found to be especially influential in determining how far students get. One element targets the low end of the curriculum: more coursetaking activity at the low end of the curriculum (below the level of Algebra I) leads to students making less progress. On the other end, we found that students move farther through the curriculum in schools that offer calculus. Further, when there is less variation in the number and type of low-level courses taken, the courses students take are more equitably distributed by family social class. Our multivariate analyses indicated that in schools whose curricula include fewer courses taken below algebra and more high-end offerings (especially calculus), students progress farther in the mathematics curriculum.[16]

Curriculum structure and achievement. In general, we conclude that the findings of this study provide evidence that is consistent with the constrained curriculum approach laid out at the beginning of the report. When the high school mathematics curriculum is structured by limiting low-end course options, students typically move farther through the curriculum and average achievement in the school is higher. However, more variation within schools in how far the students get in the pipeline, on average, is associated with *higher* achievement, not lower.[17] Although average progress in the mathematics pipeline was unrelated to social equity in the distribution of achievement, more variability among low-level credits in that curriculum resulted in more inequality in achievement within schools by student SES.[18]

Sector, curriculum, and achievement. In this study, there were few significant effects of school sector on the outcomes. Although no-difference findings typically are not discussed in a report such as this, we highlight our non-findings regarding school sector for several reasons. Several other studies about the high school curriculum have used a school sector focus (e.g., Bryk, et al 1993; Lee & Bryk 1989). We also used sector differences as a guiding framework to structure our review of the literature. In addition, in this sample we found observed sector differences in curriculum, reported in the descriptive information in table 2.

We offer two possible explanations for the lack of sector differences here. The first focuses on our analytic models. Once curriculum structure was included in the multivariate models, in general the effects of school sector (i.e., comparisons of Catholic and NAIS schools to public schools) disappeared. Of course, academic organization (or curriculum structure) represents a major difference between private and public secondary schools, as we described at the beginning. Therefore, controlling for structural differences explained away sector differences. A second explanation focuses on our sample. Because all of the schools in the HSES sample are located in or near America's largest cities, schools in rural areas, those in and around towns and villages, and schools in mid-sized cities are not represented. It is also possible that the difference between this sample of schools and students and samples used in prior studies of this topic (that were closer to being nationally representative) accounts for differences between our findings and those of other studies with a similar focus.

Some Implications of These Findings

Composition. What kinds of students go to which types of schools, and what happens to those students in their schools, are fundamental questions embedded in school effects studies such as this one. In this study, we found strong effects for school social and academic composition. The HLM models took into account many social and academic characteristics of students, as well as the structure of the high school curriculum. However, even when these controls were included, students' progress in the mathematics course pipeline and their achievement were shown to be adversely affected when there are high proportions of low-achieving students in the school, even when students' own academic status at the beginning of high school is taken into account.

This finding is consistent with conclusions made by Barr and Dreeben (1983) and by Rutter and his colleagues (1979). Although those two studies examined learning in schools with different contexts, the authors of both studies described the detrimental effects on overall achievement when there are large proportions of low-performing students in an educational setting. The context for Barr and Dreeben's study was first-grade classrooms; Rutter et al. studied inner-city London secondary schools.

We found that social as well as academic composition is important; the social-class level of the school influences achievement, even when several academic characteristics of students and schools were taken into account. This finding touches on the issue of access. U.S. students are mapped to high schools either through residential location, by parental

choice among public schools, or through parents' and students' interest, ability, and willingness to consider private schools. Residential location, by far the most common determinant of school social and academic composition, is associated with family income. Increasingly, students and their families may choose the high school they attend. Choice of school, as well as willingness to exercise choice, is also related to family background (Carnegie Foundation for the Advancement of Teaching 1992; Lee, Croninger, & Smith 1994). The issue of access involves equity between schools, whereas the focus on equity in this study was within schools. Nevertheless, our findings underscore the importance of school social composition in determining average coursetaking and average achievement, above and beyond the structure of the curriculum.

Low-level mathematics courses. Most studies of curriculum structure and achievement have focused on the high end of the mathematics curriculum. Our investigation of schools that offer large numbers of low-level courses—and the association of this type of curriculum with students' coursetaking and achievement—are new. We demonstrate that when schools offer many low-end courses, students don't move very far into the higher end of the curriculum. When schools offer fewer of these courses, students take fewer of them (see technical note 16). Instead, they take more advanced courses, the type of courses that much research (including this study) has shown to be associated with achievement (Lee, et al [1993] review this research). Virtually every high school, district, and state requires at least two years of mathematics to graduate, and some require more. Thus, students have to take some mathematics courses. The question is, "Which ones do they take?"

Although taking low-level mathematics courses is associated with lower achievement, the curriculum in comprehensive high schools typically contains many such courses. The rationale for offering these courses may be that high school staff feels a responsibility to respond to perceived or actual student demand. When such courses are available, however, many students choose (or are counseled into) them. Some students are highly motivated or follow advice from parents who are well aware of the long term implications of taking demanding courses. Other adolescents, however, may not be academically ambitious or prepared to dive into demanding academic courses, and some parents may not have the experience and knowledge to offer guidance in this respect. The results of this study are consistent with conclusions made by Philip Cusick, who discussed the implications of extensive student choice in high schools that offered a broad curriculum with many undemanding courses. He called this system: ...electiveness accompanied by an open, non-tracked system... There are high school students who are either very mature or who have sufficient parental guidance to help them make their choices. But for those who are neither mature nor receiving any parental guidance, such a system may further disadvantage the already disadvantaged (Cusick 1983, p.76).

We also found that high school curriculum structure influences social equity in achievement. When there is greater variation in a school's pattern of mathematics courses taken below Algebra I, there is more inequity in both coursetaking and achievement within the school. It is often socially disadvantaged students who take large numbers of low-level courses (Lee & Bryk 1988, 1989; Lee, Smith, & Croninger 1997; Oakes 1990).

These results, coupled with findings that demonstrated that schools where students took many low-end courses had lower achievement, suggest a direction for reform of the mathematics curriculum in U.S. high schools. High schools might consider the impact of offering no more than a very small number of courses below the level of Algebra I. These are, in essence, remedial courses. Taking such courses should be an unusual event, intended only as remediation to prepare students to take academic math courses.[19] Perhaps schools and districts might want to re-evaluate whether students should be able to satisfy graduation requirements with low-level courses. If these types of courses meet these requirements, students can graduate without having taken any academic courses.

Specialized vs. constrained curriculum, revisited. The findings of this study are consistent with the constrained curriculum approach in high school mathematics. However, the specialization model remains dominant in U.S. comprehensive high schools. Historically, the comprehensive public high school has been an institution that under one roof serves students with a wide range of abilities, interests, and future plans (Cusick 1983; Powell, et al 1985). The need to serve a diverse group of students in U.S. schools is as important today as it was at the beginning of this century. There are, however, several modes of meeting this goal. U.S. public high schools have traditionally approached this task by offering separate programs to diverse groups of students (Oakes 1985; Powell, et al 1985). Catholic high schools, with a similar tradition of educating socially and academic diverse students and families, historically approached the same task rather differently (Bryk, et al 1993).

This curriculum full of specialization and choice became the dominant mode of public secondary school design when young people could leave high school and move into relatively high paying jobs that required few skills learned in school. As Murnane and Levy (1996) point out, however, the workplace that young people now face looks quite different. These authors conclude that all students need solid mathematical skills to function in the workplace of the 21st century, whether or not they are planning to attend college, whether or not they are intellectually curious, and whether or not they are highly motivated to engage in academic work while they are in high school. Regardless of future plans or present inclinations, all students now need a solid base in mathematics.

Our results show that high schools where students take more mathematics courses offer fewer low-end courses. When schools offer mostly demanding academic courses, students advance further through the academic math curriculum. This pattern of student coursetaking is associated with their attaining higher achievement by the time they finish high school. In general, the results described in this report and the conclusions and implications we draw from them are consistent with several other of our published articles that focus on the general topic of curriculum structure (Lee 1993; Lee & Bryk 1988, 1989; Lee, Croninger, & Smith 1997; Lee, Smith, & Croninger 1997).

Other Conclusions From This Study

How this study differs from other school effects studies. Because school effects studies investigate how the characteristics of schools influence the students attending those

schools, analysis in such studies should reflect the nature of the research questions—they should be multilevel. Because this study falls into the school effects category, we used such multilevel methods. Methodologically, the study described in this report is similar to several other recent studies on this topic that we described at the beginning. However, this research differs in other ways from those studies. The comments in this section may be most relevant for researchers considering the HSES data for their own studies. In particular, we discuss some differences between the HSES data compared to NELS:88.

To whom may we generalize? One difference is the sample. Compared to school effects studies that used NELS:88 data, the HSES data offer several advantages. One is larger within-school sample sizes. Statistical theory tells us that larger within-group samples lead to more precise estimates of the random parameters investigated in multilevel analysis (here, we estimated coursetaking and achievement, as well as relationships between both of these outcomes and student SES within each school). Another advantage is that NCES has supplied school-level design weights with the HSES data. High-school weights are not included in the NELS data files; researchers who wished to pursue this type of study had to either confine their analyses to the student level, run multilevel analyses unweighted, or make their own school weights. None of these options is satisfactory for secondary data analysts, particularly those who may not be fully familiar with the NELS school "sampling strategy."

On the other hand, researchers who use the HSES data should give considerable thought to how the sample of schools and students used in this study departs from national representativeness. The original sample of HSES schools comes only from the areas in and around America's largest cities, so schools in rural areas are excluded. Researchers also need to consider the procedure used to augment the sample of tenth graders within the HSES schools. In each high school in the HSES sample, the entire group of NELS students who were selected originally (in 1988) and were tenth graders (in 1990) was retained in the HSES within-school sample. However, augmentation samples of students in each school were drawn randomly from among the remaining tenth graders in the school. Thus, the combined sample of students within schools actually is two separate samples: one is a de facto sample (the original NELS students) and one is close to a randomly drawn sample. As these are actually two student samples, researchers cannot be sure how representative the combined sample of students in each school is of the population of 1990 tenth graders in that school. Additionally, the large amount of missing data in the HSES leaves researchers unclear about the representativeness of the operational sample even compared to the original HSES sample described in the codebook (Scott, et al 1996). These questions about sampling raise issues about the population of students and schools to whom results should be generalized.

Statistical control for ability. The structure of the HSES dataset, and how it differs from that of the "parent" NELS data files, may have influenced the findings from this study. The base year of HSES is 1990, when students were near the end of the tenth grade. Data were collected for the first time from the augmented portion of the student sample half way through high school, compared to the full NELS (for which data are available from students before they entered high school in 1988). Thus, for only part of the HSES

sample are test scores available at high school entry. If researchers wish to measure achievement gain over the four years of high school, which is necessary if they wish to assess the full impact of attending high schools on students (the essence of a school effects study), then the HSES dataset as a whole will not allow this kind of investigation. Our approach to this problem was to include a proxy measure of mathematical ability, the grades students earned in math during their first year of high school. Of course, use of this proxy factors out a quarter of students' experiences in high school.

We suggested that this measure was a reasonable proxy for mathematical ability. On the other hand, our measure is clearly not as good as a score on a test of achievement that is on the same scale as the outcome measure. We recognize that this control for mathematical ability at the start of high school may offer imperfect adjustment for this important personal characteristic. In addition to tapping student ability, course grades usually reflect school grading policies, relative student performance, and non-academic behavior. The lack of objective ability measures on students just before they enter high school, particularly achievement, is a drawback of using HSES data for school effects study compared to NELS, where test scores are available on virtually all students at eighth grade.

Our conclusions here are identical to those made by Lee and Bryk (1989), who commented on their research using the High School and Beyond data:[20] "There is always the possibility, of course, that the estimated school effects may be somewhat different if we had a better measure of the initial ability of students" (1989, p.186). Although we could have used the measure of mathematics achievement at the end of tenth grade as a statistical control for ability, we suggest that by doing this we would be controlling away even more of the school effects we wish to estimate.

> Were sophomore achievement used as a proxy for differences in ability on entry into high school, the effects of school organization on the social distribution of achievement would be almost entirely adjusted away because much of these distributional differences are likely to be in place by the end of the sophomore year (Lee & Bryk 1989, p. 177).

A new measure of curriculum structure. The variable we used to operationalize students' progress in the mathematics pipeline represents an innovation in several respects over past efforts to measure the construct of coursetaking. First, rather than focusing only on the number of mathematics courses taken (or even the number of academic courses completed), our measure focuses on the most advanced course students have taken in high school. Thus, this measure serves as an indicator of both the quantity and the content of courses taken. Second, because we drew information about coursetaking from students' transcripts rather than from self-reports, the measure is quite reliable. Third, the school-level aggregate of this measure (and its standard deviation) represents one of several indicators (or perhaps a byproduct) of the structure of the high school mathematics curriculum. Hopefully, our efforts here represent an advancement in conceptualizing high school curriculum structure. Other researchers should consider this new indicator and perhaps apply the idea to other subjects in the curriculum.

The effects on learning are indirect. Both our findings and our conceptualization of how the structure of the high school mathematics curriculum influences students' achievement in this subject (from figure 1) suggest an alternative approach. Our findings indicate that curriculum structure influences achievement mostly indirectly, following a two-stage process. In the first step, what courses a school offers (how many of which type) determines in large part what courses students take, even after accounting for their demonstrated performance in the subject. In the second step, the number and type of courses students take determine their achievement. Research on this topic might focus more fruitfully on investigating indirect effects such as these, rather than the typical approach of estimating only direct influences on achievement. Actually, it is usually total effects that researchers what to know, represented by the combination of direct and indirect effects.

Final Comments

Our final comments are both substantive and methodological. Our results suggest that where students go to high school has implications for their success. The composition of some high schools, with large numbers of low-achieving students and large proportions of economically disadvantaged students, is associated with lower student achievement (above and beyond the disadvantage individual students experience from low SES and low achievement status at entry). The implications from the findings of this study also pertain to possible reform of the high school math curriculum, at both low and the high end. The results may also have implications for the curriculum in elementary and middle schools. Mathematics is a cumulative subject requiring mastery of lower-level concepts before more advanced topics can be undertaken. To reach a skill level in mathematics during high school that is recognized as useful after graduation, in general students should be computationally and conceptually able to take Algebra I at high school entry (i.e., in the 9th grade).

In at least three respects, this study represents an innovation compared to other recent studies of curriculum structure (some of them our own). One contribution is the new measure of curriculum structure, one that adds a new dimension to this work. Another contribution is the larger samples of students within schools compared to other studies with NELS data. Larger within-group samples allow more precise estimates of the constructs that are the focus of any study of this type. A third contribution relates to the conceptualization of the process through which curriculum structure influences achievement, a process that is to a great extent indirect as well as direct.

On the other hand, we see a few limitations to using the HSES data for investigations of this type. One is the smaller and potentially unrepresentative sample of high schools. Another is the lack of data on a substantial proportion of HSES students as they enter high school, as well as difficulties involved in estimating school effects only for the last half of high school. Clearly, researchers who are interested in pursuing investigations that focus on school effects need to consider these issues as they undertake their work and make decisions about the best data and methods to use.

References

Angus, D.L. & Mirel, J.E. (1995). *Rhetoric and reality: The American High school curriculum, 1945-1990.* In D. Ravitch and M. Vinovskis (Eds.), *Learning from the past: What history teaches us about school reform* (pp. 295-328). Baltimore, MD: Johns Hopkins University Press.

Barr, R. & Dreeben, R. (1983). *How schools work.* Chicago: University of Chicago Press.

Boyer, E.T. (1983). *High school: A report on secondary education in America*. New York: Harper & Row.

Bryk, A.S., Lee, V.E., & Holland, P.B. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press.

Bryk, A.S. & Raudenbush, S.W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.

Bryk, A.S., Raudenbush, S.W., & Congdon, R.T. (1994). *Hierarchical linear modeling with the HLM/2L and HLM/3L programs*. Chicago, IL: Scientific Software International (SSI).

Carnegie Foundation for the Advancement of Teaching (1992). *School choice: A special report.* Princeton, NJ: Author.

Clune, W.H. & White, P.A. (1992). "Education reform in the trenches: Increased academic course taking in high schools with lower achieving Students in states with higher graduation requirements". *Educational Evaluation and Policy Analysis*, 14(1), 2-20.

Coleman, J.S., Hoffer, T., & Kilgore, S.B. (1982). *High school achievement: Public, Catholic, and private schools compared.* New York: Basic Books.

Conant, J.B. (1959). *The American high school today*. New York: McGraw Hill.

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

Cusick, P.A. (1983). *The egalitarian ideal and the American high school*. New York: Longman.

Gamoran, A. (1987). "The stratification of high school learning opportunities". *Sociology of Education*, 60, 135-155.

Goodlad, J. (1984). *A place called school*. New York: McGraw-Hill.

Hyde, J.S., Fennem, E., & Lamon, S.J. (1990). *Gender difference in mathematical performance: A meta-analysis*. Psychological Bulletin, 107, 139-155.

Ingels, S.J., Dowd, K.L., Baldridge, J.D., Stipe, J.L., Bartot, V.H, & Frankel, M.R. (1994). *National Education Longitudinal Study of 1988. Second Follow-Up: Student Component Data File User's Manual*. NCES94-374. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Jones, L.V., Davenport, E.C., Bryson, A., Bekhuis, T., & Zwick, R. (1986). "Mathematics and science test scores as related to courses taken in high school and other factors". *Journal of Educational Measurement*, 23, 197-208.

Kleibard, H.M. (1986). *The struggle for the American curriculum 1893- 1958*. New York: Routledge.

Lantz, A.E. & Smith, G.P. (1981). "Factors influencing the choice of nonrequired mathematics courses". *Journal of Educational Psychology*, 73(6), 825-837.

Lee, V.E. (1985). *Investigating the relationship between social class and academic achievement in public and Catholic schools: The role of the academic organization of the school*. Cambridge, MA: Harvard University, unpublished dissertation.

Lee, V.E. (1993). "Educational choice: The stratifying effects of selecting schools and courses". *Educational Policy*, 7(2), 125-148.

Lee, V.E. & Bryk, A.S. (1988). "Curriculum tracking as mediating the Social distribution of high school achievement". *Sociology of Education*, 61, 78-94.

Lee, V.E. & Bryk, A.S. (1989). "A multilevel model of the social distribution of high school achievement". *Sociology of Education*, 62, 172-192.

Lee, V.E., Croninger, R.G., & Smith, J.B. (1997). "Course-taking, equity, and mathematics learning: Testing the constrained curriculum hypothesis in U.S. secondary schools". *Educational Evaluation and Policy Analysis*, 19(2), 99-121.

Lee, V.E., Croninger, R.G., & Smith, J.B. (1994). "Parental choice of schools and social stratification in education: The paradox of Detroit". *Educational Evaluation and Policy Analysis*, 16(4), 434-457.

Lee, V.E. & Ekstrom, R.B. (1987). "Student access to guidance counseling in high school". *American Educational Research Journal*, 24, 287-310.

Lee, V.E. & Smith, J.B. (1993). "Effects of school restructuring on the achievement and engagement of middle-grade students". *Sociology of Education*, 66(3), 164-187.

Lee, V.E. & Smith, J.B. (1995). "Effects of school restructuring and size on gains in achievement and engagement for early secondary school students". *Sociology of Education*, 68(4), 241-270.

Lee, V.E. & Smith, J.B. (1996). "Collective responsibility for learning and its effects on gains in achievement for early secondary school students". *American Journal of Education*, 104(1), 103-147.

Lee, V.E. & Smith, J.B. (1997). "High school size: Which works best, and why?" *Educational Evaluation and Policy Analysis*, 19(3), Fall 1997.

Lee, V.E., Smith, J.B., & Croninger, R.G. (1997). "How high school organization influences the equitable distribution of learning in mathematics and science". *Sociology of Education*, 70(2), 128-150.

McDonnell, L.M. (1988). *Coursework policy in five states and its implications for indicator development*. Santa Monica, CA: Working paper for the Rand Corporation.

Monk, D. and Haller, E.J. (1993). "Predictors of high school academic course offerings: The role of school size". *American Educational Research Journal*, 30, 3-21.

Murnane, R. (1975). *The impact of school resources on inner city children.* Cambridge, MA: Ballinger.

Murnane, R.J. & Levy, F.S. (1996). *Teaching the new basic skills: Principles for educating children to thrive in a changing economy*. New York: Free Press.

National Association of Secondary School Principals (1996). *Breaking ranks: Changing an American institution*. Reston, VA: Author, in partnership with the Carnegie Foundation for the Advancement of Teaching.

National Commission on Excellence in Education (1983). *A nation at risk: The imperative for educational reform*. Washington, D.C.: U.S. Government Printing Office.

Oakes, J. (1985) *Keeping track: How schools structure inequality*. New Haven, CT: Yale University Press.

Oakes, J. (1990). "Opportunities, achievement, and choice: Women and minority students in science and mathematics". In C.B. Cazden (Ed.), *Review of Research in Education*, 16, 153-222.

Oakes, J., Gamoran, A., & Page, R. (1992). *Curriculum differentiation: Opportunities, outcomes, and meaning*. In P.W. Jackson (Ed.), *Handbook of research on curriculum* (pp. 570-608). New York: McMillan.

Powell, A.G., Farrar, E., & Cohen, D.K. (1985). *The shopping mall high school: Winners and losers in the educational marketplace*. Boston: Houghton-Mifflin.

Romberg, T.A. (1992). *Problematic features of the school mathematics curriculum.* In P.W. Jackson (Ed.), *Handbook of research on curriculum* (pp.749-788). New York: Macmillan.

Rosenthal, R. & Rosnow, R.L. (1984). *Essentials of behavioral research*. New York: McGraw Hill.

Rutter, M., Maughan, B., Mortimore, P., Ouston, J., & Smith, A. (1979). *Fifteen thousand hours*. Cambridge, MA: Harvard University Press.

Sandel, M. (Ed). (1984). *Liberalism and its critics*. New York: New York University Press.

Scott, L.A., Ingels, S.J., Pulliam, P., Sehra, S., Taylor, J.R., & Jergovic, D. (1996). *National Education Longitudinal Study of 1988. High School Effectiveness Study: Data File User's Manual*. Washington, DC: National Center for Education Statistics, U.S. Department of Education (March 1996).

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

Sizer, T.R. (1992). *Horace's school: Redesigning the American high school*. Boston: Houghton-Mifflin.

Tyack, D. (1974). *The one best system*. Cambridge, MA: Harvard University Press.

Useem, E.L. (1991). "Student selection into course sequences in mathematics: The impact of parental involvement and school policies". *Journal of Research on Adolescence* 1(3), 231-250.

Meeting Five Critical Challenges of High School Reform:

Lessons from Research on Three Reform Models

Executive Summary

Janet Quint

PREVIEW DRAFT

Not fully edited or fact-checked

Not for citation, quotation, publication, or distribution

Expected Publication Date: May 2006

http://www.mdrc.org

High school reform has moved to the top of the education policy agenda, commanding the attention of the federal government, governors, urban school superintendents, philanthropists, and the general public. All are alarmed by stubbornly high dropout rates, by the low academic achievement of many high school students, and by the large numbers of high school graduates who are required to take remedial classes in college. These trends disproportionately affect urban and certain rural areas and minority groups: the most troubled high schools are concentrated in about 50 large cities and 15 primarily southern and southwestern states, and the majority of their students tend to be African-American or Hispanic.

This is the first in a planned series of papers summarizing and synthesizing what MDRC has learned from rigorous and large-scale evaluations of high school reform initiatives. It discusses three comprehensive initiatives — Career Academies, First Things First, and Talent Development — that have grappled with the challenges of improving low-performing urban and rural schools. This paper includes only limited findings from non-MDRC research, but subsequent papers in this series will synthesize lessons from other studies of high school reform conducted at MDRC and elsewhere as these findings become available.

Each of the three programs that MDRC studied involved multiple components (brief descriptions of the three programs and their evaluations appear in Table ES-1.) Each program, too, featured a philosophy or theory of action that linked the various components into a coherent whole that program developers believed would be more than the sum of its parts, and the developers offered considerable technical assistance about how best to put the components in place. MDRC's evaluations of these programs built on rigorous research designs using comparison or control groups, and they provide unusually strong evidence about the programs' effects on attendance, academic achievement, persistence in school through graduation, and postsecondary education and labor market outcomes. But these impacts reflect the combined effects of *all* the components, packaged in a particular way by the programs' developers.

This paper takes a different path. It discusses five major challenges associated with low-performing high schools and offers lessons addressing each. While aiming to be useful to researchers, the paper is primarily directed toward policymakers, practitioners, and others who must make hard choices about how to change high schools. These decision-makers may or may not want to join forces with a multi-component comprehensive school reform model like the ones that MDRC studied, but they seek informed advice about which reform elements to put in place.

In response, this paper looks inside the "black box" of the three comprehensive reforms and seeks to draw reasoned conclusions about which particular aspects of the reforms made them effective (or, in some cases, proved ineffective). It tries to link particular outcomes to particular inputs, using available evidence from MDRC's evaluations, including analysis of student

Table ES-1

Key Features of the Initiatives and Their Evaluations

Career Academies

Key Program Features

- "School-within-a-school" structure
- Integrated academic and occupational curriculum
- Employer partnerships providing career awareness activities and work internships

Study Design

- **Methodology**: Random assignment of eligible and interested students either to the Career Academy in their school or to the regular high school program.
- **Evaluation period:** 1993-2006 (projected).
- **Sites evaluated:** Nine Career Academies in San Jose, Santa Ana, and Watsonville, CA; Washington, DC; Miami Beach, FL; Baltimore, MD; Pittsburgh, PA; and Socorro, TX.
- **Student characteristics**: Race/ethnicity: 30% Black, 56% Hispanic; family receiving welfare or food stamps: 24%; average baseline performance on state assessments: 39% at 24th percentile or lower in math, 35% at 24th percentile or lower in reading.

First Things First

Key Program Features

- School-wide, thematic small learning communities
- Family Advocate (faculty advisory) System
- Instructional improvement efforts

Study Design

- **Methodology:** Comparative interrupted time series analysis.
- **Evaluation period:** 1999-2004.
- **Sites evaluated**: Four high schools in Kansas City, KS; three high schools in Houston, TX; one high school each in Greenville and Shaw, MS and in the Riverview Gardens School District, MO.
- **Student characteristics:** Race/ethnicity: 48% Black, 36% Hispanic; eligible for free/reduced-price lunch: 69%; average baseline performance on state assessments: 41% failing or in bottom two proficiency categories in math, 32% failing or in bottom two proficiency categories in reading.

Talent Development

Key Program Features

- Ninth-Grade Success Academy
- Career Academies for students in upper grades
- Extended block schedule
- Catch-up courses in reading and math for 9^{th} graders with low skills

Study Design

- **Methodology:** Comparative interrupted time series analysis.
- **Evaluation period:** 1999-2004.
- **Sites evaluated**: Five nonselective high schools in Philadelphia, PA.
- **Student characteristics:** Race/ethnicity: 75% Black, 23% Hispanic; eligible for free/reduced-price lunch: 86%; average baseline performance on state assessments: 86% below basic level in math, 76% below basic level in reading.

records, teacher and student surveys, and field research, along with the program developers' own theories of change, where possible. At the same time, it acknowledges that each program may be more than the sum of its components and that conclusions about which components of the initiatives generated impacts can never be as solidly grounded as conclusions about the effects of the programs as a whole. Thus, while phrases like "appears to" and "suggests that" are not completely satisfying, they remind readers that the lessons go beyond the bounds of what is known with certainty about component effects.

Because of the methodological issues, the majority of these lessons must be seen as judgments, not facts. But almost all of the judgments are grounded in evidence, although that evidence is thick in some cases, thinner in others. In a few instances, the judgments represent the assessments of the program developers or of researchers who have studied the programs for many years. In presenting the lessons below, an effort has been made to give the reader a sense of the evidence on which each lesson is based; for further details, readers are referred to the body of the paper.

Challenge One: Creating a Personalized and Orderly Learning Environment

A positive school climate, where students and adults know each other well and where adults express care and concern for students' well-being, intellectual growth, and educational success, is a key motivational element in the learning process for adolescents. But the large size of many low-performing high schools leaves many students, especially those who are less academically successful, feeling lost and anonymous and prevents the development of an atmosphere conducive to learning. This problem may be exacerbated for ninth-graders leaving behind the more family-like environment of middle school — a critical issue because analyses of data on students attending urban schools have found that those who do not complete ninth grade successfully and on schedule are at greatly heightened risk of dropping out altogether. The studies suggest changes in the structure and functioning of large high schools that can help remedy the impersonality of large high schools, although the lessons in this regard begin with a caveat:

- **Implementing small learning communities — groups of students who share the same cadres of core-subject teachers — is likely to improve the climate of schools but will not, in and of itself, increase student achievement. It may help to do so, but the studies do not provide conclusive evidence on this point.** All three initiatives studied involved small learning communities. Talent Development improved eleventh-grade math and reading test scores for students at where the intervention had been in place longest. But Career Academies had no effect on achievement, and First Things

First was effective in boosting achievement only in the first district where it was implemented and in one school in a second district

- Student survey data suggest that **small learning communities are an effective way of making students feel known and cared about by their teachers.** Students in First Things First schools registered higher levels of perceived support from their teachers after the demonstration was implemented than they had before it was put in place, and Career Academy students reported higher levels of teacher support than members of a control group.

- The experiences of First Things First in Kansas City, Kansas, and of Talent Development in Philadelphia indicate that **both small learning communities that encompass all four grade levels and separate Freshman Academies followed by communities for upperclassmen can play a role in increasing attendance and reducing dropout rates.** While feeling connected to teachers and classmates is only one factor that promotes attendance and persistence, both interventions, with their different small learning community structures, had positive effects on these outcomes.

- **The separate Freshman Academy structure may have played a key role in helping more ninth-graders succeed in the critical first year of high school.** Students in Talent Development's Ninth Grade Success Academies received special attention from their teachers, and their rates of attendance and on-time promotion were higher than those of ninth-graders in comparison schools.

- **Faculty advisory systems can give students a sense that there is an adult in the school looking out for their well-being**. Almost three-quarters of First Things First students reported on surveys that their advisor was either "very important" or "sort of important" in giving them someone to talk to when needed, helping them do better on schoolwork, and recognizing their accomplishments. Training helped family advocates perform their roles more effectively.

- School administrators and program operators report that **scheduling classes so as to ensure that they contain only teachers and students within the same small learning community presents a major challenge in putting small learning communities in place.** This challenge is especially marked for students in the upper grades, who may want to take electives offered only by communities other than the one to which they belong.

Challenge Two:
Assisting Students Who Enter High School with Poor Academic Skills

Large numbers of students enter urban high schools poorly prepared for academic success. The Ninth Grade Success Academy, the centerpiece of the Talent Development model, tackled the problem of low achievement among entering ninth-graders head-on through interconnected changes in scheduling and curricula and produced positive results for many students. The Talent Development experience suggests the following lessons:

- **A double-blocked class schedule is useful because it permits students to attempt and earn more credits per year than other scheduling arrangements.** In contrast to a traditional schedule (entailing daily 50-minute classes) or a single-blocked schedule (involving 80- or 90-minute classes meeting every other day), a double-blocked schedule calls for classes that meet daily for extended periods. Because students in double-blocked classes could cover what would normally be a year's worth of material in a single semester, Talent Development schools could earn four full course credits each term and eight credits each year, compared with the six or sometimes seven credits per year that students would receive in schools following a traditional schedule.

- **Semester-long, intensive "catch-up" courses that shore up ninth-grade students' skills in reading and mathematics appear to help students succeed in the regular curriculum, with gains in credits earned being sustained over time.** The catch-up courses in Talent Development awarded elective credits and were designed to precede and prepare students for college preparatory classes in English I and algebra, which were required for graduation. (The double-blocked schedule allowed the catch-up and regular classes to be sequenced in this way.) First-time ninth-graders in the Talent Development schools were significantly more likely than their counterparts elsewhere to earn one or more credits in English and algebra. For these students, too, the intervention increased the total number of credits earned in the first three years of high school.

- **The structured curriculum of the Talent Development catch-up courses, combined with longer class periods, may have helped ensure that students spent more time in these classes "on task."** More time in the classroom may not in itself be enough to improve achievement; what appears to matter is that the extra time be used to maximize learning. Most First Things First schools made substantial progress in implementing longer English and

math class periods. However, during the period under study, no special curricula were in place, and most expansion-site schools did not register increases in student achievement.

- **Little is currently known about how best to assist and prevent dropping out among students who struggle the most in ninth grade**. While Talent Development increased the rate of promotion to tenth grade, those students in Talent Development schools who were required to repeat a full year of ninth grade were more likely to drop out of high school than their counterparts in other schools. Different grouping arrangements and modes of instruction may be needed for such students.

Challenge Three: Improving Instructional Content and Practice

Teachers in schools serving disadvantaged populations are often less experienced and less knowledgeable about the subjects they teach than teachers in more affluent communities. The high school reforms that MDRC studied have addressed questions about how to improve the content and delivery of what is taught through the use of new curricula and through professional development. While only limited data are available linking instructional improvement efforts to changes in student outcomes, the experiences of the program developers and of the participating schools and teachers suggest a number of operational lessons about putting instructional improvement efforts in place.

- **It may not be realistic to expect teachers to create their own curricula reflecting the themes of their small learning communities; instead, they are likely to benefit from well-designed curricula and lesson plans that have already been developed.** First Things First's developers expected teachers to integrate the theme of their small learning communities into their classes, but teachers said that they had neither time nor training to do this, and field research observations and interviews indicate that thematic instruction was uncommon. Similarly, teachers of academic subjects in the Career Academies generally followed the standard curriculum, rather than creating lessons that reflected their academy's occupational focus.

- **Good advance training and ongoing coaching can help teachers make better use of even well-designed curricula.** Teachers in Talent Development schools who received training on teaching the catch-up courses reported that the training had helped them deliver their lessons more effectively.

- There is suggestive evidence that **professional development activities that involve teachers working together to align curriculum with standards, review assignments for their rigor, and discuss ways of making classroom activities more engaging may help boost student achievement.** The expansion-site high school that the First Things First developer and researchers agreed had made most progress in developing "professional learning communities" of teachers who met regularly to discuss pedagogy showed positive impacts on reading achievement.

- **Both academic departments and small learning communities should be regarded as key venues for instructional improvement**. First Things First developers initially sought to focus instructional improvement efforts on the small learning community. But they came to realize that, while the small learning community is an appropriate setting for professional development directed toward improving pedagogical *methods*, teachers look to other department members as repositories of *content* expertise, and that departments should therefore be incorporated into initiatives to improve instructional quality.

- **If administrators want teacher meetings to focus on instructional improvement, they must both provide guidance about how to do this and must follow up to ensure that meeting time is used productively.** Researchers' observations of teacher meetings in small learning communities revealed that, without specific direction about how to spend their time together, teachers talked mostly about matters unrelated to instruction (such as discipline issues, individual students' personal or academic problems, or planned small learning community field trips or parties). When administrators issued guidelines specifying that meetings were to focus on instruction — and when they sat in on these meetings — discussion centered instead on pedagogical concerns.

Challenge Four: Preparing Students for the World Beyond High School

Students in low-performing schools need special assistance in preparing for postsecondary education and for better-paying jobs. Among the initiatives considered in this paper, Career Academies are most clearly oriented toward the goal of helping students prepare for productive futures after they leave high school. (The other initiatives sought to improve academic achievement and graduation rates but did not have a strong postsecondary thrust, and none of-

fered services specifically aimed at increasing college enrollment.) The Career Academies experience suggests the following lessons:

- **Earnings impacts for young men in Career Academies appear to be linked to career awareness activities and work internships during high school.** Young men in the Career Academies group earned over $10,000 more than members of a control group over the four-year period following their high school graduation. Participation in career awareness sessions and work internships most clearly distinguished the in-school activities of Career Academy students from those of their counterparts who were not in the Academies.

- **The potential benefits of partnerships between high schools and employers can be more fully realized when these partnerships are more structured and when schools can designate a full-time, non-teaching staff person to serve as a liaison with employers.** Students in Career Academies with more structured partnerships and with full-time liaisons reported higher levels of participation in career awareness and work-based learning activities than did students in Academies where arrangements were less formal and where liaisons also had teaching responsibilities.

- **Improving the academic component of Career Academies may be needed to raise students' achievement on standardized tests and help them secure admission to college.** Students in the Career Academies did not have higher academic achievement or graduate from high school at higher rates than their non-Academy counterparts, nor were they more likely to enroll in college or earn a credential. Field researchers found that core-subject classes in the Academies were very similar to those in the rest of the school.

Challenge Five: Stimulating Change

Introducing change into high schools and making it stick goes beyond the discrete challenges discussed above. The implementation lessons below primarily reflect the perceptions and judgments of program developers and researchers. They are likely to apply not only to ambitious and large-scale reforms like the ones studied here but also to less far-reaching efforts to introduce change into overstressed high schools.

- **Creating effective change demands an investment of personnel resources.** Whether these personnel come from inside or outside a school or

district, they must be skilled in designing reforms, putting them in place, and monitoring ongoing operations.

- **In deciding whether to adopt a comprehensive reform model or add new components to existing programs, school and district administrators should consider the adequacy of what is already in place and the capacity of local personnel to envision and implement change.** The fewer the reform elements already in place and the more limited the capacity of local staff, the more sense it may make for administrators to turn for assistance to the developers of comprehensive models.

- **Strong support of the initiative by the school district helps to ensure effective implementation and the reform's continuing existence.** The contrasting experiences of First Things First in Kansas City, Kansas, and of Talent Development in Philadelphia exemplify this point. In Kansas City, the central office leadership both exerted pressure on the schools to operate in conformity with First Things First guidelines and supported the schools' efforts to do so; close and consistent monitoring was a hallmark of the district's efforts. While the School District of Philadelphia initially welcomed Talent Development, it never formally endorsed the initiative or gave it support, and some of its actions (for example, the introduction of a new standardized curriculum) undercut the program model.

- **It is important for policymakers and administrators to avoid jumping from one reform to the next; instead, they should stay the course until initiatives have been put in place long enough and well enough for their effectiveness to receive a fair test.** Research has shown that comprehensive reforms in place for five years or more had stronger impacts than those with briefer periods of implementation. Extended research follow-up may also be important: In the Career Academies evaluation, for instance, the initiative's substantial effects on postsecondary employment were evident four years after students' scheduled graduation from high school.

- **It is important to have high ambitions but also reasonable expectations about the size of impacts that reforms can produce**. The impacts of reform efforts are seldom large and dramatic — especially when they are carefully evaluated. But even impacts that appear to be small can nonetheless be important. For example, Talent Development's 8 percentage-point effect on the rate of promotion from ninth to tenth grade means that hundreds of

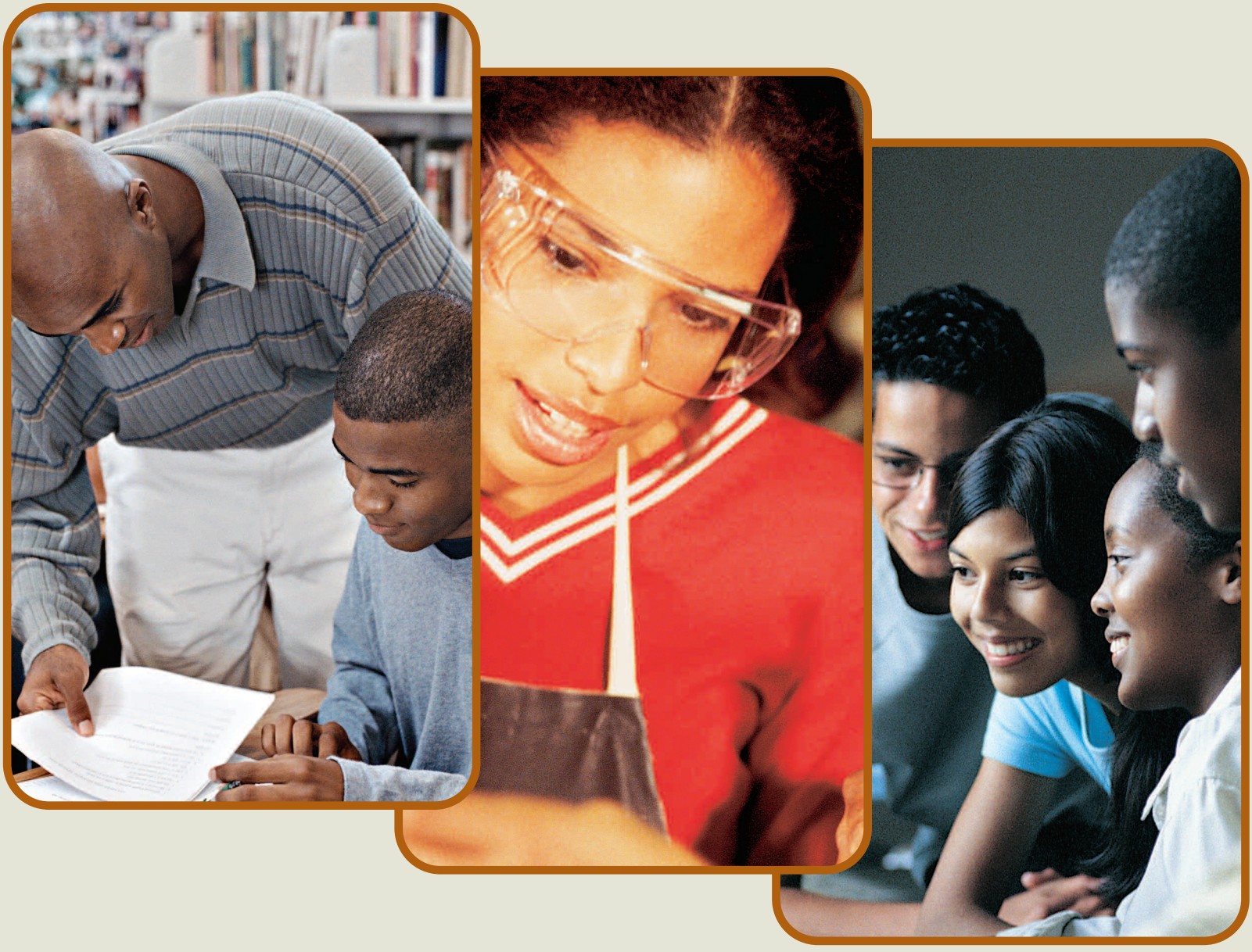
freshmen in Talent Development schools did not have to repeat the year and were at much lower risk of dropping out of school altogether.

The larger lesson of this paper is that *personalization* and *instructional improvement* are the twin pillars of high school reform. Small learning communities and faculty advisory systems can increase students' feelings of connectedness to their teachers. Especially in interaction with each other, extended class periods, special catch-up courses, high-quality curricula, pre-service and in-service training on these curricula, and efforts to create professional learning communities can improve student achievement. Furthermore, school-employer partnerships that involve career awareness activities and work internships can help students attain higher earnings after high school.

A further message is that students who enter ninth grade facing substantial academic deficits can make good progress with the right supports. These supports include caring teachers and special courses designed to help them to acquire the content knowledge and learning skills they missed out on in earlier grades.

Whether districts and schools adopt a comprehensive reform initiative like the ones MDRC studied or put together the elements of a comprehensive intervention on their own, much has been learned about what is needed. What remains is to put that learning into practice.

Executive Summary: Evaluation of the Bill & Melinda Gates Foundation's High School Grants, 2001–2004



Prepared by:

The American Institutes for Research

AMERICAN INSTITUTES FOR RESEARCH®

SRI International

SRI International®

Executive Summary: Evaluation of the Bill & Melinda Gates Foundation's High School Grants, 2001–2004

Prepared for:

The Bill & Melinda Gates Foundation
P.O. Box 23350
Seattle, WA 98102

Prepared by:

The National Evaluation of High School Transformation
http://www.air.org/publications/pubs_ehd_school_reform.aspx

American Institutes for Research
1000 Thomas Jefferson St., NW
Washington, DC 20007
http://www.air.org

SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025
http://ctl.sri.com

Contents

Introduction

A team of researchers from the American Institutes for Research (AIR) and SRI International (SRI) has been conducting a national evaluation of the Bill & Melinda Gates Foundation's high school initiative since 2001. The goals and methods of the evaluation are described in detail in *Charting a Course: Evaluation Design of the National School District and Network Grants Program* (AIR/SRI, 2003a). This document summarizes evaluation findings that were published this summer in three reports.

The first evaluation report, *Creating Cultures for Learning: Supportive Relationships in New and Redesigned High Schools* (2005), examined the progress of foundation-supported schools in implementing close, supportive communities focused on learning, paying special attention to the relationships between and among students and teachers.

The second report, *Rigor, Relevance, and Results in New and Conventional High Schools* (2005), investigated whether the school-level changes described in the first report have corollaries in the classroom. By examining the rigor and relevance of teacher assignments and student work, the report examined teaching in foundation-supported schools to see whether school-level changes found in the first report set the stage for classroom innovation. The second report then examined learning in these schools, describing the nature and quality of the work students produced.

The final report, *Getting to Results: Early Student Outcomes in New and Redesigned High Schools* (2005), examined student outcomes in foundation-supported schools during the early years of the initiative, drawing upon a number of different data sources, including extant district demographic and achievement data, surveys of teachers and students, and site visits to schools. This report focused on the characteristics of students attending foundation-supported schools and selected student outcomes (e.g., assessment scores, attendance) in the foundation-supported schools compared to other high schools in the same district.

About the Bill & Melinda Gates Foundation's High School Grants

The Bill & Melinda Gates Foundation's theory of change addresses the need for whole K–16 system change, stressing the importance of the individual relationships high school students forge with each other and with the adults in their schools. Building on its experience and recent research, the foundation has established key partnerships with state education agencies, school districts, and other organizations to improve high school graduation rates by promoting the new "three R's"—rigor, relevance, and relationships. The three R's are derived from a number of key attributes of effective schools. These attributes are common focus, high expectations, personalization, respect and responsibility, time to collaborate, performance-based learning, and technology as a tool. The foundation believes high schools should become places that combine rigorous academic programs with relevance to students' interests and potential career opportunities, supported by positive relationships that can motivate students both academically and personally.

The foundation recognizes that there are multiple models for fostering the three R's. By supporting a variety of high schools, the foundation is striving to improve graduation rates and other outcomes for high school students, including students who have traditionally fallen through the cracks. Across this wide spectrum, the foundation supports a variety of strategies, including two basic approaches to reform at the school level. Some foundation-supported organizations are creating brand new high schools by replicating the core designs of existing, successful high schools, while others are redesigning existing comprehensive high schools into smaller learning communities that share a building or campus. Generally speaking, foundation-supported schools are expected to be inviting places, where students and adults know each other well and pursue a common mission of high academic achievement for all students, and where the professional community is collaborative and student-focused. (See the technical appendices of each of the reports for details about the construction of measures described in this document.)

In working toward these goals, the evaluation has identified promising examples of success combined with several challenges. Key overarching findings include the following:

- Teachers and students at both newly established and redesigned schools are making progress in developing a positive culture that supports student learning.

- Compared to comprehensive high schools, the quality of student work in new and redesigned high schools is higher in English/language arts, but slightly lower in mathematics.
- Initial student achievement levels are promising for English/language arts, but not for mathematics.

The remainder of this report identifies and discusses key findings generated from each of the three evaluation reports. This is followed by a discussion of implications. The report concludes with information about the evaluation and a brief description of the data collected by school type.

Creating Cultures for Learning

The first report in this series, *Creating Cultures for Learning: Supportive Relationships in New and Redesigned High Schools* (2005), found the following:

- Students and teachers at newly established schools reported a very positive learning culture, characterized by close interpersonal relationships, common focus, and mutual respect and responsibility (see Table 1 for components of school learning culture).
- Redesigned high schools are also seeing progress as they work to change existing structures, cultures, and beliefs, but at a slower rate than new schools.
- Though new and redesigned high schools have made progress in creating positive learning environments compared to comprehensive high schools, both have faced serious challenges in creating and sustaining more effective learning environments.

Data from surveys administered to students and teachers in 24 new schools during the year in which they opened indicated that the schools had a much more positive climate—in terms of both personalization of the learning environment and a common focus among teachers and students—than was found in the comprehensive high schools we studied (see Figure 1). Although we cannot rule out the possibility that these new schools attracted self-selected groups of motivated, like-minded students and staff, it is clear that they have established an environment marked by stronger relationships between students and teachers and by more staff collaboration and participation in decision-making than is typical of traditional high schools.

Table 1. Cultures for Learning—The Foundation's Attributes of High-Performing Schools

Attribute	*Description*
Common Focus	Staff and students are focused on a few important goals. The school has adopted a consistent, research-based instructional approach based on shared beliefs about teaching and learning. The use of time, tools, materials, and professional development activities are aligned with instruction.
High Expectations	Staff members are dedicated to helping students achieve state and local standards; students are engaged in an ambitious and rigorous course of study; and students leave school prepared for success in work, further education, and citizenship.
Personalization	The school is designed to promote sustained student relationships with adults; every student has an adult advocate and a personal plan for progress. Schools are small—no more than 600 students (fewer than 400 is strongly recommended).
Respect and Responsibility	The environment is authoritative, safe, ethical, and studious. The staff teaches, models, and expects responsible behavior, and relationships are based on mutual respect.
Time to Collaborate	Staff has time to collaborate and develop skills and plans to meet the needs of all students. Parents are recognized as partners in education. Partnerships are developed with businesses to create work-based opportunities and with institutions of higher education to improve teacher preparation and induction.
Performance-Based	Students are promoted to the next instructional level only when they have achieved competency. Students receive additional time and assistance to achieve this competency when necessary.
Technology as a Tool	Teachers design engaging and imaginative curriculum linked to learning standards, analyze curriculum's results, and have easy access to best practices and learning opportunities. Schools publish their progress for parents and engage the community in dialogue about continuous improvement.

Source: Bill & Melinda Gates Foundation. (no date). *Helping All Students Achieve* [Pamphlet]. Seattle: Author.

New high schools, however, can expect a "second-year slump," which our data suggest is primarily due to a significant increase in student and teacher population from year 1 to year 2 (growth from a 9th-grade school to a 9th- and 10th-grade school) with a recovery in year 3 in these attributes.

While redesigned high schools are seeing slower progress than new schools, they too are showing gains over time, most notably in the implementation of personalized school cultures in which students feel that their teachers know and support them both academically and personally (see Figure 2).

The most significant positive change reported by students and staff during interviews and focus groups at redesigned schools was an improvement in interpersonal relations. Students reported feeling better known and supported by staff after school redesign. Some students talked about their teachers as having higher expectations for them because of their

Figure 1. Higher Mean on Implementation Index and School Attributes in New Schools Than Pre-Redesign and Comparison Schools

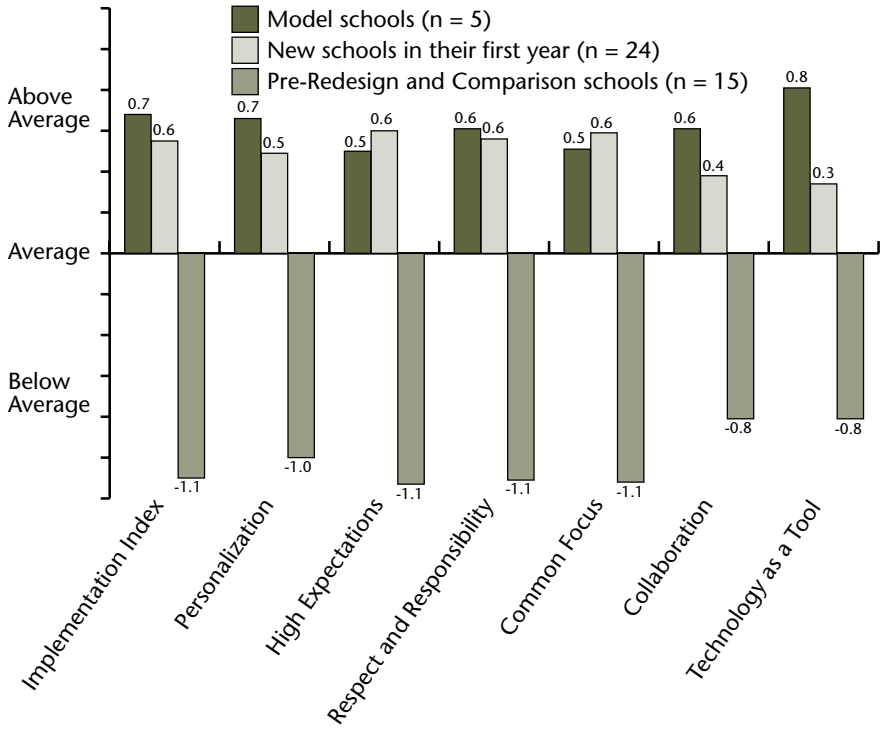
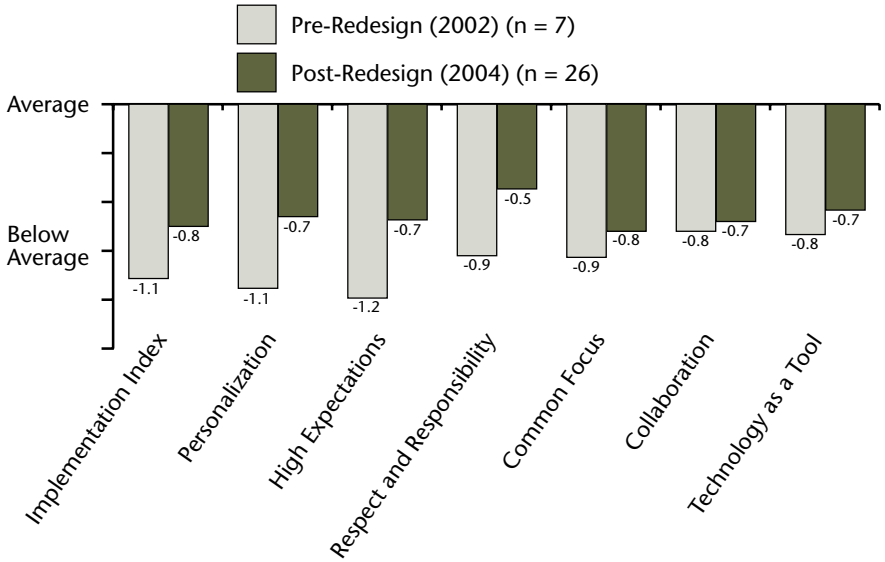


Figure 2. Improvement in Implementation Index and School Attributes in Redesigned High Schools



increased knowledge of the students' capabilities. Teachers reported having closer relationships with their students and working more collaboratively with other teachers within their small learning communities (SLCs). One negative note was mentioned by some math and science teachers who expressed a sense of loss caused by the breaking up or weakening of the comprehensive schools' departmental structure when the SLCs were created.

The report offered a number of cautionary remarks regarding the creation and long-term sustainability of new and redesigned high schools. With respect to new schools, challenges included the following:

- Severe cuts and deficits in education budgets in many states and districts had deleterious effects on schools in general and on still-developing, innovative schools in particular. In some districts, layoffs hit new schools very hard because so few of their teachers had seniority within the system. Budget cuts and associated changes in staffing formulas forced many of the schools to increase their class sizes.
- Teacher capacity and burnout threatened the viability of new schools. Many faculty accepted unwieldy teacher workloads as a temporary price to pay to establish a more effective school, but many are now finding that these workloads may be endemic to the staffing structures of many small high schools.

The challenges of transforming an existing school culture and organization within the same building and with largely the same population of teachers and students are often very different from those faced by new school teams. Challenges faced by redesigned schools include the following:

- Logistical issues, most notably scheduling, often delayed and risked preventing the paradigm shifts often required to instill a culture of high academic expectations for all students. As a result, changes in teaching and learning have generally lagged behind structural changes.
- Creating high-quality choices for all students within a large campus requires a dramatic change in the structural and organizational features of the comprehensive high school, but just as importantly, it requires a commitment and capacity to change the inequalities that are endemic to such schools. There are notable differences in the quality of the learning culture across small learning communities, even among those created from the same comprehensive school. At times, these differences can be attributed to pre-existing special or magnet programs. In other cases, the divergent approaches to redesign segregated different kinds of students and teachers into particular SLCs. Educators voiced concerns that not all choices available to students would lead to the selection of an SLC that provided a high-quality education.

Rigor, Relevance, and Results

The *Rigor, Relevance, and Results in New and Conventional High Schools* report (2005) found the following:

- Assignments in the new high schools were more relevant to the real world and to students' lives than those given in the comprehensive high schools planning a redesign.
- Assignments that are relevant are also more likely to be rigorous.
- Teacher assignments in the English/language arts involved more rigor at new high schools than at the other schools in the study.
- Rigor was poor in mathematics across new and redesigned schools.
- The quality of student work across new and redesigned schools was low.

This report examines the rigor and relevance of assignments that teachers give to students, and, in project-based learning schools, examines the assignments that students give to themselves, with assistance from and negotiation with teachers and mentors (see Table 2 for definitions of rigor and relevance). The report examines rigor and relevance scores for assignments given in new high schools and compares them to redesign high schools in the planning year prior to their reformation into smaller learning communities.

Table 2. Instructional Rigor and Relevance

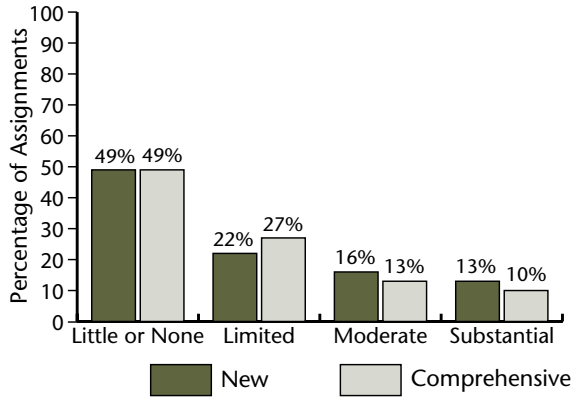
Rigor	***Relevance***
Assignments ask students to • Use their existing knowledge and skills to create or explore new ideas rather than reproduce information. • Demonstrate conceptual understanding of important content. • Organize, interpret, evaluate, and synthesize information. • Communicate clearly and well. • Revise work based on informative feedback.	**Assignments ask students to** • Address questions or problems with real-world applications. • Make choices about what they will study and how they will study it. • Take on plausible writing roles and submit their work to real audiences.

Our findings for new schools suggest that changes in teaching and learning tend to lag behind structural change in foundation-supported schools—both for new schools and redesign efforts. Initially, the nuts and bolts of designing and putting in place the small-school structure take precedence over curriculum and teaching. It takes time to develop the curriculum and teaching approaches being adopted by a school.

We begin with the clear and unambiguous results for relevance. Not surprisingly, assignments in the new high schools were more relevant to the real world and to students' lives than those given in the comprehensive high schools planning a redesign. Students in new schools had more choice in what they would learn and how they would learn it. This was the case both for English/language arts and for mathematics. We found that in English/language arts, students' learning opportunities at new high schools involved more rigor than at the other schools in the study; teachers at the new high schools were more than twice as likely to provide assignments with substantial rigor as their counterparts at the comprehensive high schools.

In mathematics, however, our analysis showed that rigor looked similar across the two school types—similarly poor. Half of the assignments at both types of schools exhibited little or no rigor (see Figure 3). This means we saw little opportunity for students to exhibit deep conceptual knowledge of important mathematical content or to formulate problems from situations, make generalizations, or judge the validity of arguments.

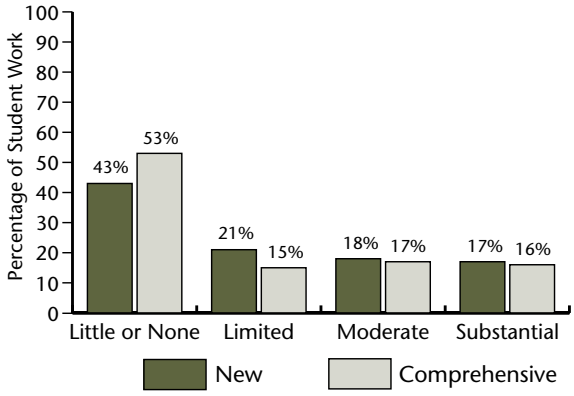
Figure 3. Lack of Rigor in Mathematics Assignments in Both New and Pre-Redesign High Schools



In addition to teacher assignments, we also reported results regarding the quality of students' work. Specifically, we found that the quality of students' work in new high schools is higher in English/language arts, but slightly lower in mathematics, when compared to the comprehensive high schools (see Figure 4 for English/language arts results). More importantly, we concluded that the quality of student work in all of the schools we studied is alarmingly low. This is not surprising, however, because students cannot demonstrate high-quality work if they have not been given assignments that require deep understanding and exploration, demonstration of conceptual thinking, ability to interpret and synthesize information, and other

such skills. This clearly reflects the lack of rigor found in teacher assignments related to mathematics. While progress is occurring with respect to English/language arts, more rigor is still needed.

Figure 4. Slightly Higher-Quality Work in New High Schools Compared to Pre-Redesign High Schools



Getting to Results

Findings from the *Getting to Results: Early Student Outcomes in New and Redesigned High Schools* report (2005) addressed student outcomes in four urban school districts. After completing this report, we carried out similar analyses in four additional school districts. We include these additional districts in the discussion below. In addition to analyzing district enrollment and achievement data, the *Getting to Results* report explored the relationship between performance on state assessments and the measures of school culture examined by *Creating Cultures for Learning: Supportive Relationships in New and Redesigned High Schools* (2005).

Foundation-supported schools are enrolling students from traditionally underserved populations. In the eight urban school districts examined, we found foundation-supported schools enrolling a higher proportion of students who were eligible for free or reduced-priced lunch and who were members of a racial/ethnic minority group than other high schools in the same district. Compared to other schools in their districts, redesigned schools generally enrolled a greater percentage of students with special education or language acquisition needs as well. New schools tended to enroll fewer students from these populations than other schools in the same district, but this was not the case in all districts. Perhaps even more important than the student demographic characteristics, both new and redesigned schools generally enrolled students who began high school academically behind students attending other schools in the same district.

Challenge of Assessing Student Outcomes

Assessing student outcomes for students attending foundation-supported schools has been challenging. The schools included in these analyses have been serving students for 3 or fewer years. While we concentrated our analysis on districts that had a relatively large number of foundation-supported schools, the number of schools that had been open long enough to have assessment data is limited. Many schools initially enroll only grade 9 students, and assessments are generally administered in grades 10 or 11. Therefore, these results should be interpreted with caution as they reflect only the initial results for the subset of schools where data are currently available.

Our ability to gauge the effectiveness of redesigned high schools is also limited. The data currently available for many of these schools are from their planning year(s) and do not yet reflect the impact of changed instructional practices. Consequently, we analyzed data from redesign and pre-redesign high schools separately. For the schools that had broken out into smaller learning communities, test results for the initial cohorts often reflect the cumulative effectiveness of instruction received before and after the school redesign.

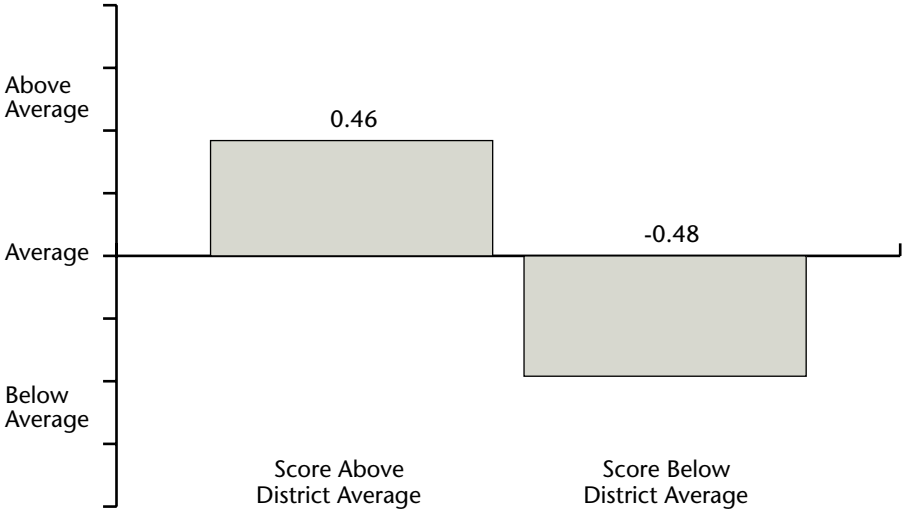
Based on the data currently available, it appears that new schools have been successful with respect to attendance, test scores, and the quality of students' work in English/language arts. The attendance rates at new schools have been generally higher than rates at other schools in the same districts. While the average reading scores of students attending new schools lag behind the district average in some districts, this difference is generally reversed after statistically controlling for level of students' prior achievement. In the subset of districts where we can examine reading scores over multiple academic years, new schools are exhibiting a more positive trend in reading scores than nonsupported schools in the same district. We have not been able to find similar positive results for math performance on a consistent basis. In general, the math achievement level of students attending new schools is on par with or lagging behind other schools in the same district.

It is important to point out that the disparity in assessment results in redesigned high schools was greatly reduced when we statistically controlled for prior achievement level. In order to improve, redesigned high schools in many districts will need to address attendance problems. In half of the districts with large high schools that have converted into SLCs, we detected poorer attendance levels than in other schools in the district.

The degree to which schools had implemented the three new R's was positively related to school-level English/language arts performance. We found a significantly higher level of implementation of the foundation's school attributes in those foundation-supported high schools that scored above their district's mean on English/language arts assessments than in those that scored below the district mean (see Figure 5). However, we

found no such positive relationship for math. In fact, all the associations we observed were negative. That is, implementation levels, reform instruction, and positive student attitudes tended to be higher in foundation-supported high schools that scored *below* their district's mean on math assessments than in schools that scored above their district's mean. None of these negative relationships were statistically significant, however.

Figure 5. Implementation of Desired Characteristics Tied to Student Achievement



In summary, the first returns are promising for English/language arts but worrisome for mathematics. Our concerns for mathematics are heightened because the implementation data we have collected through surveys and site visits point to challenges in this subject area.

Implications

In the future, the evaluation will continue to inform the foundation's emerging theory of change that builds on additional district- and state-level efforts. We envision the theory of change will reflect the interrelated parts of whole-system change, including policy, school restructuring, instruction, and student outcomes aligned with college readiness.

Over the past 3 years, we have reported mounting evidence that the new and redesigned high schools created through the foundation's initiative provide a more positive learning culture for both students and teachers. As the initiative has been rolled out, three critical issues have emerged:

(1) the effectiveness of teaching and learning, (2) the potential for long-term sustainability, and (3) initial student outcomes. This year's report series offers a number of key insights into these three issues.

Teaching and Learning

The following key implications for teaching and learning are drawn from our research:

- Teachers in nearly all schools are calling for more useful professional development materials, offerings, and coaching, particularly in math.
- Many grantees lack the capacity to meet these professional development needs.
- Additional assistance from the foundation may be needed to help schools develop effective instructional strategies and materials for math. This assistance should strive to leverage existing resources.

The *Rigor, Relevance, and Results in New and Conventional High Schools* report (2005) stresses the importance of professional development around teaching practices that incorporate both rigor and relevance, as well as the availability of compelling illustrations of rigorous, relevant work. In almost every school, teachers asked for help in developing and honing their practice. Especially important is professional development on the implementation of innovative practices within the context of current standards and accountability requirements.

One source of this professional development support could be the intermediary organizations that the foundation has funded to work with the schools. However, these organizations vary markedly in their histories and the nature of their expertise (AIR/SRI 2003b, 2004). In cases where schools did not receive curriculum resources from their grantee organization, they had the added burden of developing their own curriculum while also starting or reforming a school. This led all too often to reverting back to packaged software or traditional district textbooks.

The report stresses the equal importance of supplementary academic support in these schools. As described in the report, school staff cited lack of tutoring services and appropriate opportunities to do homework as a barrier for many of the students in foundation-affiliated schools. In some sites, business and community partners have provided mentors or tutors. Existing public and private initiatives offer potential partners and sources of funding for these activities.

All three reports suggest that mathematics instruction is particularly problematic for new and redesigned schools. In the *Getting to Results:*

Early Student Outcomes in New and Redesigned High Schools report (2005), we found no evidence of foundation-supported schools making progress in mathematics achievement. This lack of progress may reflect some foundation-supported schools' stress on individualized learning programs built around student interests; some students treat mathematics in a cursory manner in this climate. In addition, some foundation-supported schools have struggled with hiring and retaining qualified math teachers. Teachers have reported that good mathematics curricular materials consistent with their instructional philosophies are hard to find; multidisciplinary resources are particularly elusive.

Many of the schools started under this initiative stress a project- or problem-based approach that is theoretically compatible with teaching mathematics concepts and skills, but is difficult to reconcile with the specifics of district and state standards for algebra and geometry courses. Rather than expecting individual grantees or schools to solve this problem for themselves, the foundation could fund an organization with instructional development expertise in secondary mathematics to develop materials and offer training for teachers. Many examples of fruitful curriculum and instruction combining mathematics and science (and even mathematics and social studies) exist, and many of them are funded by the National Science Foundation. Either the foundation or its grantees may want to consider providing technical assistance and professional development specifically for math and science teachers working in small innovative high schools. The foundation could also make a contribution in the recruitment, preparation, and placement of teachers with high-level mathematics knowledge and skills to help high-need students succeed in college-preparatory mathematics.

Sustainability

The following key implications for sustainability are drawn from our research:

- Successful schools recognize that close partnerships with outside organizations can be essential in terms of sustaining the reform effort beyond the grant period.
- The foundation and its grantees need to help shape the policy environment in which schools are nested.
- In most cases, sustaining foundation-supported reform at the school level will require direct and indirect support beyond 3 years.

Our evaluation work suggests that new and redesigned schools are vulnerable organizations, with limited internal capacity and numerous external challenges. To mitigate these obstacles, we suggested in the *Creating*

Cultures for Learning: Supportive Relationships in New and Redesigned High Schools report (2005) that schools develop multiple partnerships early in their design process as an important supplement to internal capacity. To carry out the vision of the foundation's initiative, schools and teachers are going far beyond the traditional notion of an academic education to help students, in the words of one teacher, not just get through their classes but to "get through their life."

Although the intermediary organizations funded through this initiative offer many supports (AIR/SRI, 2004), few offer the full range of services needed to carry out all school functions. Some schools are benefiting from additional partnerships targeted to a particular curricular need, such as a biotech company sponsoring equipment for a specialized course that meets the school's theme. Other partnerships are deeply integrated into the school design, such as those with teaching colleges or with counselors who provide personal social services to students.

Moreover, the *Creating Cultures for Learning: Supportive Relationships in New and Redesigned High Schools* report (2005) suggests that the foundation and its grantees should continue active support of the initiative's schools in the face of district and state actions that undercut fundamental components of their designs. Most school districts are experiencing difficult financial times. Both new and redesigned schools must be considered fragile entities well beyond the first 3 years of their existence. A critical role for the foundation and its grantees is to garner support for the incubation of these schools. Changes in funding formulas that force drastic increases in class size or that require schools to lay off a large portion of their teaching staff can easily destroy the special quality of these schools. Advocacy against district and state policies that hamper new independent schools more than established schools is one important activity. Grantee support of schools as they negotiate for more supportive district policies is another. The foundation and its grantees may want to focus more of their energy and resources on protecting the schools that have already been started, even if it means starting fewer new schools.

Finally, grant decisions made under this initiative should take into account plans for school sustainability. Most schools in this program receive direct funding and support for the first 3 years. Although both new and redesigned schools typically make progress in that time, the extremely complex processes of institution building and school transformation take more than 3 years to complete, as demonstrated by the still-evolving status of schools whose foundation funding has ended. Strategies for continued support for reform—potentially by providing funds to involve more mature schools in the mentoring and support of new school staff

—should be explored. In addition, as the foundation moves toward focusing its education investments in specific districts or states, it can catalyze local partnerships that will support reforming schools over the longer term.

Student Outcomes

Our research produced the following key implications in terms of student outcomes:

- Evaluation of secondary schools' performance should focus as much as possible on a "value added" definition of success.
- While the positive findings for English/language arts are encouraging and the lack of positive finding for math are discouraging, it is too early in the initiative to draw definitive conclusions concerning student outcomes.

The final report in the series, *Getting to Results: Early Student Outcomes in New and Redesigned High Schools* (2005), concludes that judgments of secondary schools' performance should take into account the different levels of academic and attitudinal preparation students bring to high school. Foundation-supported high schools are successfully enrolling the populations targeted by the initiative. Research on classrooms suggests that teachers of classes with large numbers of low-achieving students perceive constraints on the instructional content and techniques they can use (e.g., the need to focus more on basics and discipline and less on deep content and student initiative). Similarly, research on schools suggests that high concentrations of low-achieving students are associated with problems such as higher levels of delinquency (for a review of the literature, see Lee et al., 1999). Our own evaluation work describes many of the challenges teachers in foundation-supported schools report as they work to educate high-need students (AIR/SRI, 2004). While it should never be used as an excuse, the low level of academic skills with which many students enter foundation-supported high schools needs to be kept in mind. High schools should be given credit for the gains in academic mastery their students demonstrate, even if what they learn should have been mastered in middle or even elementary school.

Second, it is too early in the initiative to draw definitive conclusions concerning student outcomes. The schools included in these analyses have been serving students for 3 years or fewer. Patterns may change as additional years of data become available and reform efforts move forward. School-level outcome data can be very unstable from year to year, especially in schools with small enrollments. Prior research on school improvement efforts suggests that a timeframe of 5–6 years is appropriate for assessing the viability of an educational intervention.

Working with state education agencies, school districts, and other educational organizations, the foundation has been successful in reaching the students most in need of improved secondary education. The replication of the positive relationships reported by the guiding literature involving school attributes, classroom instruction, and student attitudes indicates that reform efforts are touching the lives of young people. During its first 3 years, the Bill & Melinda Gates Foundation's national high school

initiative examined not only the establishment of close relationships but also the efforts to institute effective teaching and learning and to produce positive student outcomes. As many schools are in the fourth year of existence now, in the 2005–2006 school year, we will soon be able to address high school graduation and preparedness for college.

About the Evaluation

The types of schools in the study and the timing of data collection are shown in Table 3.

Table 3. Description of Data by School Types

School Type	*Data Available*
New schools: Newly created autonomous schools that received foundation funding for the first 3 years.	Surveys and site visits in each of the school's first 3 years. Rolling sample of schools (i.e., new schools are added each year, and each stays in the sample for 3 years), beginning in 2001–2002. Teacher assignments and student work were collected in 2003–2004 and 2004–2005. Districts supplied demographic and student outcome data from 2001–2002, 2002–2003, and 2003–2004.
Redesigned schools: Comprehensive high schools receiving foundation funding to support their breakup into smaller learning communities; funds typically were received for 1 planning year and 2 years of subsequent redesign.	Site visits in each of the 3 funded years; surveyed in planning year and again 2 years later (in the second year of redesign). Rolling sample of schools, beginning with those that began to receive foundation funding in 2001–2002 (typically their planning year). Teacher assignments and student work collected during the planning year for one group in 2002–2003 and for another group in 2003–2004. Districts supplied demographic and student outcome data from 2001–2002, 2002–2003, and 2003–2004.
Other schools: Large public high schools and public high schools that impose selection criteria or offer a specialized curriculum (e.g., performing arts), located in one of the four districts selected for analysis of student characteristics and outcomes that did not receive foundation assistance.	Districts supplied demographic and student outcome data from 2001–2002, 2002–2003, and 2003–2004.

New schools were surveyed and visited during each of the first 3 years of operation. The data collected allow us to track change over time in individual schools. Schools undergoing redesign were surveyed in their planning year and again 2 years later. The data gathered support pre- and postreform comparisons, as these schools were also visited for

3 consecutive years (in their planning year, and in the first and second years of implementing the redesign). We also collected survey and site-visit data from established schools that served as models for the new schools. These schools provide benchmark data for the new schools. Additionally, we collected the assignments given in class by teachers, and the work students produced in response to those assignments. To examine student outcomes, we also collected extant data from foundation-supported schools and other schools within their jurisdictions (in four districts). Details of data collection and analyses can be found in the technical appendices of each of the three reports.

Acknowledgements

This executive summary is drawn from three reports prepared by AIR/SRI:

- *Creating cultures for learning: Supportive relationships in new and redesigned high schools,* by Linda Shear, Mengli Song, Ann House, Ben Martinez, Barbara Means, and Becky Smerdon.
- *Rigor, relevance, and results in new and conventional high schools,* by Karen Mitchell, Jamie Shkolnik, Mengli Song, Kazuaki Uekawa, Robert Murphy, Mike Garet, and Barbara Means.
- *Getting to results: Early student outcomes in new and redesigned high schools,* by David Rhodes, Becky Smerdon, Winona Burt, Aimee Evan, Ben Martinez, and Barbara Means.

The full reports were completed in 2005 and are available online at the following Web site: http://www.air.org.

The authors of these reports and this executive summary would like to acknowledge the formatting assistance received from Sanjay Seth and Michael Rollins.

References

AIR/SRI. (2003a). *Charting a course: Evaluation design of the National School District and Network Grants Program.* Washington, DC: American Institutes for Research. Available at http://www.gatesfoundation.org/Education/ResearchAndEvaluation/Evaluation/NHSDGEvaluation.htm

AIR/SRI. (2003b). *High time for high school reform: Early findings from the evaluation of the National School District and Network Grants Program.* Menlo Park, CA: SRI International.

American Institutes for Research/SRI International. (2005). *Creating cultures for learning: Supportive relationships in new and redesigned high schools.* Menlo Park, CA: SRI International.

American Institutes for Research/SRI International. (2005). *Rigor, relevance, and results in new and conventional high schools.* Menlo Park, CA: SRI International.

American Institutes for Research/SRI International. (2005). *Getting to results: Early student outcomes in new and redesigned high schools.* Menlo Park, CA: SRI International.

Lee, V. E., Smith, J. B., Perry, T. E., & Smylie, M. A. (1999). *Social support, academic press, and student achievement: A view from the middle grades in Chicago.* Chicago, IL: Consortium on Chicago School Research.

Selected Readings

American Diploma Project, (2004). *Ready or not: Creating a high school diploma that counts.* Washington, DC: Achieve, Inc.

Greene, J. P., & Winters, M. A. (2005). *Public high school graduation and college-readiness rates: 1991–2002.* Education working paper no. 8. New York: Center for Civic Innovation, Manhattan Institute for Policy Research.

MDRC. (2001, December). *Career academies: Impacts on students' initial transitions to post-secondary education and employment.* (Education working paper no. 8). New York: J. J. Kemple. Retrieved July 20, 2005, from http://www.mdrc.org/Reports2002/CA_StudentsImpacts/CA_StudentImpactwTech.pdf

Newmann, F. M., Marks, H. M., & Gamoran, A. (1996). Authentic pedagogy and student performance. *American Journal of Education, 104*(4): 280–312.

Vander Ark, T. (2001). Rethinking our educational system from the classroom to the boardroom. *Business Perspectives,* Spring: 18–25.


NATIONAL
EVALUATION OF
HIGH SCHOOL
TRANSFORMATION

Brown	**Harold**	KnowledgeWorks Foundation	brown@ksfdn.org
Jerald	**Craig**	Break the Curve Consulting	cjerald@comcast.net
Barrone	**Charlie**	Independent Consultant	Cbhaar@aol.com
Kemple	**James**	Manpower Demonstration Research Co	james.kemple@mdrc.org
Lee	**Valerie**	University of Michigan	velee@umich.edu
Smerdon	**Becky**	American Institutes for Research	BSmerdon@air.org
DeLisle	**Deborah**	Cleveland Heights Public Schools	D_Delisle@staff.chuh.org
DeMary	**JoLynne**	VA Superintendent of Pub Inst (Former)	jode04@comcast.net
Ferraro	**David**	Gates Foundation	david.ferrero@gatesfoundation.org
Robinson	**Jeffrey**	Baltimore Talent Development HS	JRobinson01@bcps.k12.md.us
Kohlmoos	**Jim**	NEKIA	kohlmoos@nekia.org
Orland	**Martin**	The National Academies	morland@nas.edu
Toch	**Thomas**	Education Sector	ttoch@educationsector.org
"Staff"			
Carey	**Kevin**	Education Sector	kcarey@educationsector.org
Mead	**Sara**	Education Sector	smead@educationsector.org
Rybak	**Renee**	Education Sector	rrybak@educationsector.org
Grey	**Ethan**	Education Sector - Didn't come	egrey@educationsector.org
Waters	**John**	NEKIA	waters@NEKIA.org
Mandel	**David**	The National Academies	twinters@nas.edu
Schuck	**Julie**	The National Academies	jschuck@nas.edu
Straf	**Miron**	The National Academies	mstraf@nas.edu
Winters	**Tina**	The National Academies	dmandel@nas.edu
Press			
Greenblatt	**Alan**	Governing	
Summers	**Elizabeth**	Nat'l Affairs, NewHour with Jim Lehrer	

Participants

Abrams	**Andrew**	US Department of Education	Andrew.Abrams@ed.gov
Goetz	**Braden**	US Department of Education	braden.goetz@verizon.net
Rowland	**Cortney**	Learning Point Associates	Cortney.rowland@learningpt.org
Dennis	**Gregoy**	US Department of Education	Gregory.Dennis@ed.gov
Miller	**Erika**	Isaacson, Miller, Inc.	emiller@IMSearch.com
Edelstein	**FRitz**	US Conference of Mayors	fritz@usmayors.org
LeSure	**Deborah**	US Conference of Mayors	dlesure@usmayors.org
Schneet	**M**	US Conference of Mayors	mschneer@usmayors.org
Goodwin	**David**	US Department of Education	David.Goodwin@ed.gov

Greer	**Eunice**	Scholastic, Inc.	Egreer@Scholastic.com
Jones	**Bonnie**	US Department of Education	Bonnie.Jones@ed.gov
Gettman	**Lucy**	Reading Recovery Council of N America	lgettman@readingrecovery.org
Knutson	**Marcia**	NEKIA	knutson@nekia.org
Vockley	**Martha**	Partnership fo 21st Century Skills	mmv@cox.net
Maushard	**Mary**	Cntr Soc Org for Schools, JHU	mmaushard@csoc.jhu.ed
Wasson Jordan	**Meghan**	Academy for Educational Development	mwasson@smtp.aed.org
Morris	**Helen**	Texas Instruments, Education Policy	hmorris@ti.com
Kimmelman	**Paul**	Learning Point Associates	pkimmelman@comcast.net
Burkhardt	**Gina**	Learning Point Associates	Gina.burkhardt@learningpt.org
Joftus	**Scott**	Cross & Joftus, LLC	scott@edstrategies.net
Silverberg	**Marsha**	US Department of Education	Marsha.Silverberb@ed.gov
Frost	**Susan**	Education Priorities	frost@edpriorities.net
Russell	**Chuck**	Southwest Educational Dev Lab	TexasEDU@aol.com
Moskowitz	**Jay**	American Institutes for Research	Jmoskowitz@air.org
Douglas-Nathai	**Wendy**	Academy for Educational Development	wdnathai@smtp.aed.org
Williams	**Deborah**	US Department of Education	Deborah.Williams@ed.gov
Zolt	**Nina**	In2Books	zgo@aol.com
Goodman	**Geoffrey**	US Department of Education	Geoffrey.Goodman@ed.gov
Hammond	**Peirce**	US Department of Education	Peirce.Hammond@ed.gov
Neville	**Kate**	Independent Consultant	kate.neville@verizon.net
Ripley	**Suzanne**	Academy for Educational Development	sripley@smtp.aed.org
Chelemer	**Caro;**	US Department of Education	Carol.Chelemer@ed.gov
Chessen	**Sonia**	US Department of Education	Sonia.Chessen@ed.gov
Kerschner	**Keith**	Research for Better Schools	kershner@rbs.org
Ayers	**Jeremy**	Alliance for Excellent Education	jayers@all4ed.org
Olson	**Lynn**	Education Week	lolson@epe.org
Cantrell	**Steven**	Learning Point Associates	Steven.cantrell@learningpt.org
Tierney	**Barbara**	International Reading Association	btierney@reading.org
Usdan	**Michael**	Institute for Educational Leadership	usdanm@iel.org
Dumas	**Paul**	Pacific Resources for Ed and Learning	dumasp@prel.org
Norton	**Molly**	Education Sector	mnorton@educationsector.org
Hansel	**Lisa**	American Educator, Amer Fed Teachers	lhansel@aft.org
Sawchuk	**Stephen**	Education Daily	ssawchuk@lrp.com
Devlin	**Joan**	American Federation of Teachers	jbuckley@aft.org
Powell	**Rebecca**	American Institutes for Research	rpowell@air.org
Lillie	**Vanessa**	Communication Works, LLC	vlillie@commworksllc.com

Lee	**Kristen**	Communication Works, LLC	klee@commworksllc.com
Yoder	**Karia**	Nat'l Institute for Work and Learning	kyoder@smtp.aed.org
Mutakabbir	**Yoruba**	American Federation of Teachers	ymutakab@aft.org
Bfebey	**Karen**	US Government Accountability Office	FebeyK@gao.gov
McCauley	**Diane**	US Department of Education	Diane.McCauley@ed.gov
Redfield	**Doris**	Edvantia, Inc.	doris.redfield@edvantia.org
Segal	**Nancy**	ACT	Nancy.Segal@act.org
Palmer	**Jason**	US Government Accountability Office	PalmerJS@gao.gov
Lindsley	**Tom**	Nat'l Center for Educational Accountability	tlindsley@just4kids.org
LoGerfo	**Laura**	The Urban Institute	Llogerfo@ui.urban.org
Bowler	**Mike**	US Department of Education	Mike.Bowler@ed.gov
Phillips	**Susan**	Connect for Kids	susan@connectforkids.org
Jameson	**Connie**	Nelson Mullins, Riley & Scarborough, LLP	Connie.Jameson@nelsonmullins.com
Kline	**Mal**	Accuracy in Academia	mal.kline@academia.org
Schneider	**Abbey**	Georgetown University	ams20@georgetown.edu
Cotter	**Meghan**	American Academy of Liberal Education	mcotter@aale.org
Brannum	**Robert Vinson**		rbrannum@robertbrannum.com
Baker	**Jo**	DC Public Charter School Board	baker@dcpubliccharter.com
Feinberg	**Larry**	Nat'l Assessment Governing Board	Larry.Feinberg@ed.gov
Gergen	**Christopher**	New Market Development	cgergen@k12.com
Arnold	**Kristin**	Edvance Research	karnold@edvance.org
Shek	**Katherine**	Nat'l School Boards Association	Kshek@nsba.org
Shuy	**Tanya**	Nat'l Institute for Literacy	Tanya.Shuy@ed.gov
Snowhite	**Larry**	Houghton Mifflin Company	Larry_Snowhite@hmco.com
O'Brien	**Edward**	Street Law, Inc.	Eobrien@streetlaw.org
Klauss	**Rudi**	Academy for Educational Development	rklauss@smtp.aed.org
Peltzman	**Alissa**	Achieve, Inc.	apeltzman@achieve.org
Sparks	**Jocelyn**	Legistrative Strategies, Inc.	jsparks@legstrat.com
Murphy	**Joyce**	University of Maryland, Baltimore County	Jmurphy767@aol.com
Levin	**Stephanie**	University of Pennsylvania	slevin3@pobox.upenn.edu
Gross	**Jon**	Project Grad, USA	Jgross@projectgradusa.org
Mikuta	**Julie**	Center for Reform of School Systems	mikuta@crss.org
Siegel	**Peggy**	SACS Council on Accred and Sch Improv	psiegel@sacscasi.org
Cisneros	**Cindy**	American Institutes for Research	cindylcisneros@aol.com
Miles	**William**	Public Education Network	bmiles@publiceducation.org
Rivera	**Charlene**	Cntr for Equity and Excellence in Education	crivera@ceee.gwu.edu
Miller	**Ann**	Assn of Sch Business Officials International	Amiller@asbointl.org

Goldware	**Sara**	Institute for Educational Leadership	goldwares@iel.org
Tolbert	**Clara**	Texas Instruments, Education Policy	ctolbert@ti.com
Barth	**Patte**	Nat'l School Boards Association	Pbarth@nsba.org
Glidden	**Heidi**	American Federation of Teachers	hglidden@aft.org
Heppen	**Jessica**	American Institutes for Research	Jheppen@air.org
Subotnik	**Rena**	American Psychological Association	rsubotnik@apa.org
Goldware	**Norman**	WestEd	ngoldn1@aol.com
Bonner	**Wilma**	DC Public Schools	wilma.bonner@K12.dc.us
Zager	**Robert**	Assn of Career and Technical Education	rzager@acteonline.org
Teller	**Stephanie**	US Department of Education	Stephanie.Teller@ed.gov
Ruffing	**Katie**	NASD Career Techinal Education Consortium	kruffing@careertech.org
Hausman	**Jessica**	US Department of Education	Jessica.Hausman@ed.gov
Azzam	**Amy**	Educational Leadership	aazzam@ascd.org
Mack	**Deborah**	DC Public Schools	Deborah.Mack@k12.dc.us
Feist	**Michelle**	Academy for Educational Development	mfeist@smtp.aed.org
King	**Jeffrey**	Assn. for Supervisors and Curr Dev	jking@ascd.org
Richardson	**Trenace**	Cntr for Equity and Excellence in Education	trichardson@ceee.gwu.edu
Sickler	**Heidi**	American Psychological Association	Hsickler@apa.org
Williams	**James**	US Department of Education	James.Williams@ed.gov
Lea-Kruger	**Barbara**	U Penn, Operation Public Education	bkruger@pobox.upenn.edu
Pape	**Wendy**	Rand Corporation	moltrup@rand.org
Tweed	**Anne**	Mid-Continent Res for Ed and Learning	atweed@mcrel.org
Kapinus	**Barb**	NEA	Bkapinus@nea.org
Foley	**Bethany**	Nat'l Assn St Dir of Special Ed	beth.foley@nasdse.org
Jensen	**Sarah**	US Department of Education	Sarah.Jensen@ed.gov
Cooke	**Geneise**	US Department of Education	Geneise.Cooke@ed.gov
Shop	**Anthony**	American Youth Policy Forum	ashop@aypf.org
Simon-Burroughs	**Marlene**	US Department of Education	Marlene.Simon-Burroughs@ed.gov
Gill	**Iris Bond**	American Youth Policy Forum	ibgill@aypf.org
Fu	**Brian**	US Department of Education	Brian.Fu@ed.gov
Lerner	**Jennifer**	American Youth Policy Forum	jlerner@aypf.org
Cancell	**Ethan**	Mass Insight Education	ecancell@massinsight.org
Marcelo	**Karlo Barrios**	University of Maryland	kmarcelo@umd.edu
Bhat	**Soumya**	New America Foundaiton	Bhat@newamerica.net
Fleishman	**Steve**	American Institutes for Research	Sfleischman@air.org
Chaltain	**Sandra**	First Amendment Schools Project	schaltain@freedomforum.org
Angius	**Sandra**	Edvantia, Inc.	sandra.angius@edvantia.org

Klink	**Michelle**	Alliance for Excellent Education	mklink@all4ed.org
Schunk	**Lisa**	US Senate HELP Committee	lisa_schunk@help.senate.gov
Lalla	**Jeannette**	Children's Defense Fund	Jlalla@childrensdefense.org
Pearson	**Sarah**	American Youth Policy Forum	spearson@aypf.org
McCabe	**Melissa**	CCSSO	melissam@ccsso.org
Clarke	**Lisa**	Hager Sharp	Lclarke@hagersharp.com
Dwyer	**Chris**	RMC Research	cdwyer@rmcres.com
Gamse	**Beth**	ABT Associates	beth_gamse@abtassoc.com
Braunlich	**Chris**	Thos. Jefferson Inst. for Public Policy	c.braunlich@att.net
Solares	**Grace**	DTI Associates	Gsolares@dtihq.com
Coleman	**Heidi**	NIH-Office of Science Education	colemanhe@od.nih.gov
Cheng	**Stephanie**	State Education Office	Stephanie.Cheng@dc.gov
Abdallah	**Joan**	AAAS	jabdalla@aaas.org
Vannier	**Dave**	NIH-Office of Science Education	VannierD@od.nih.gov
Brandt	**Ron**	Board-Mid-Cont Res for Ed and Learning	ronbrandt@cox.net
Klopott	**Shayna**	PhD Student - Teachers' College, Columbia	sklopott@yahoo.com
Arroyo	**Carmen**	American Institutes for Research	Carroyo@air.org
Martinez	**Monica**	KnowledgeWorks Foundation	martinezm@kwfdn.org
Hightower	**Amy**	American Federation of Teachers	ahightow@aft.org
Luke	**Stephen**	Academy for Educational Development	sluke@smtp.aed.org
Hall	**Dara**	The Education Trust	Dhall@edtrust.org
Cassell	**Mary**	Office of Management and Budget	mcassell@omb.eop.gov
Shake	**Sally**	Education Legislative Services, Inc.	carolynstarwalt@aol.com
Pinkus	**Lyndsay**	Alliance for Excellent Education	lpinkus@all4ed.org
Stom	**Anne**	US Department of Labov	Stom.Anne@dol.gov
Wurtzel	**Judy**	The Aspen Institute	judy.wurtzel@aspeninst.org
Hunter	**Bruce**	Amer Assn of School Administrators	bhunter@aasa.org
Carroll	**Tom**	Nat'l Com on Teaching & America's Future	tcarroll@nctaf.org
Earle	**Janice**	National Science Foundation	jearle@nsf.gov
Sherwood	**Robert**	National Science Foundation	rsherwoo@nsf.gov
Tucker	**William**	Education Sector	btucker@educationsector.org
Muller	**Rob**	Practical Strategy, LLC	rob@practicalstrategy.org
VanderPutten	**Elizabeth**	National Science Foundation	evanderp@nsf.gov
Noell	**Jay**	US Department of Education	Jay.Noell@ed.gov
Engel	**Penny**	AACTE	pengel@aacte.org
Johnson	**Latoya**	Office of Hillary Rodham Clinton	Latoya_Johnson@clinton.senate.gov
Fuchs	**Bruce**	NIH-Office of Science Education	bruce.fuchs@nih.gov

Leary	**Emily**	American Psychological Association	Eleary@apa.org
Cole	**Allison**	Office of Management and Budget	acole@omb.eop.gov
Randall	**Vance**	Office of Senator Hatch	Vance_Randall@hatch.senate.gov
Capozzi	**Rose**	Accuracy in Academia	Rose.Capozzi@academia.org
Montgomery	**Scott**	CCSSO	scottm@ccsso.org
Ehrich	**Rob**	Military LA - Senator Bayh	Rob_Ehrich@Bayh.senate.gov
Olsen	**Robert**	Education Policy Center	Rolsen@ui.urban.org
Denson	**Kelly**	Educational Testing Service	Kdenson@ETS.org
Burkett	**Hugh**	Thomas B. Fordham Foundation	tstewart@edexcellence.net
Burkett	**Hugh**	Cntr for Comprehensive Sch Ref and Imp	hugh.burkett@learningpt.org
Barclay	**Sarah**	Holland&Knight LLP	sarah.barclay@hklaw.com
Burke	**Daniel**	Education Research and Analysis	sbburke@att.net
Crow	**Rob**	Geo. Mason School of Law	rwcrow@gmail.com
Zapata	**Jaime**	Amer. Fed Teachers, Public Affairs	jzapata@aft.org
Cohen	**Marjorie**	Policy Studies Associates, Inc.	mcohen@policystudies.com
Juniot	**LaTanya**		latanyajunior@msn.com
Wright	**Melina**	National PTA	mwright@pta.org
Smith	**Lindsey**	Institute for Education and the Arts	lcsmith@edartsinstitute.org
Goldstein	**Miriam**	Ed Leadership Assn for Super & Cur Dev	mgoldste@ascd.org
Dicerbo	**Pat**	Nat'l Clearinghouse for Eng Lan Aquisition,GWU	pdicerbo@gwu.edu
Shah	**Amy**	Chartwell Education Group	shah@chartwelleducation.com
Smith	**Elizabeth**	ETS	Esmith@ets.org
Pinal	**America**	Center for Applied Linguistics	america@cal.org
Whiting	**Matthew**	American Psychological Association	mwhiting@apa.org
Ovard	**John**	USDE, Office of English Language Acquisition	John.Ovard@ed.gov
Sandow	**Dara**	Mid-Atlantic Cntr for Math Teach&Learn,Uof MD	sandowda@msu.edu
McCloskey	**Molly**	Assn. for Supervision and Curriculum Dev	mmccloskey@ascd.org
Fuller	**Daniel**	Assn. for Supervision and Curriculum Dev	dfuller@ascd.org
Vicks	**Erick**	Assn. for Supervision and Curriculum Dev	evicks@ascd.org
Palmer	**Matthew**	Reading is Fundamental	WMPalmer@rif.org
Finneran	**Kevin**	NAS - Issues in Science and Technology	kfinnera@nas.edu
Boyd	**William**	American Journal of Education	wlboyd@psu.edu
Harvey	**Beth**	Reach for College, Inc.	harvey150@comcast.net
Horwood	**Thomas**	Caliber, ICF Consulting Company	Thorwood@icfcaliber.com
Lubell	**Samuel**	GMMB Consulting	Samuel.Lubell@gmmb.com
Moodie	**Bess**	Public Education Network	Emoodie@publiceducation.org
Mullen	**Katie**	College Summit	kmullen@collegesummit.org

Chang	**Chiaying**	DC Public Schools	Chiaying.Chang@k12.dc.us
Sweeney	**Jeanne**	LRP Publications, Title 1 Report	jsweeney@lrp.com
Schneider	**Elizabeth**	Alliance for Excellent Education	Eschneider@all4ed.org
Mollison	**Andrew**	Education Writer	amollison@comcast.net
Kowalski	**Nick**	Infotech Strategies	kowalski@itstrategies.com
Ziebeck-Walkup	**Ann**	DC Public Schools	Ann.Ziebeck-Walkup@k12.dc.us
Rodriguez	**Roberto**	Senior Ed Advisor, Senator Kennedy	Roberto_Rodriguez@help.senate.gov
Schaetzel	**Kirsten**	Center for Applied Linguistics	kirsten@cal.org
Signed-In on March 24th			
Bowers	**J.**		
Gayl	**Chriaranne**		
Kelley	**Lauren**		

KnowledgeWorks Foundation
Empowering communities to improve education

Empowering Communities to Improve Education

Education improves lives and society. KnowledgeWorks Foundation strives to create universal access to high quality education in Ohio. The Foundation follows a unique approach to education philanthropy: *fund, facilitate,* and *do*. We believe this method of *investing, supporting,* and *actively participating* maximizes our efforts to improve education in Ohio.

Students, parents, teachers, principals, superintendents, officials, business professionals, and community members inspire and inform KnowledgeWorks Foundation's efforts to transform education in Ohio and achieve our vision of universal access to high quality education. The Foundation and education's many stakeholders must work together to further improve education in Ohio.

We ground our work in research and create partnerships dedicated to producing measurable results. KnowledgeWorks Foundation shares knowledge gained and the lessons learned at the local, state, and national levels. We believe that barriers to education can be eliminated by collaborating with public and private partners across the state and nation that share this principle: **education is the key to the success of individuals and the betterment of society**.

Education in Ohio demands attention. Ohio ranks 39th in the nation for percentage of population with a bachelor's degree. Only 59% of Ohio high school students go to college directly from high school, and studies indicate that only a third of Ohio's graduates are prepared for college. The education system must be transformed to ensure all Ohio youth meet state standards, graduate, and have the option of pursing postsecondary education.

KnowledgeWorks Foundation focuses on three key goals:

1) Transform large, comprehensive urban high schools into small, successful schools.
2) Increase the number of Ohioans who pursue postsecondary education.
3) Encourage communities to invest in their schools, and schools to engage the community.

High Schools

Students in Ohio's urban high schools demonstrate serious shortcomings in academic performance. Over the course of five years, KnowledgeWorks Foundation's high school initiatives will work to change urban schools dramatically, and forever alter the conventional wisdom about how schools are designed and organized. These initiatives and the results they produce are based on research, best practices, and local insights. KnowledgeWorks Foundation advocates for successful small high schools, Early College high schools, and an integrated system of education, which not only focuses on academic achievement but also the social support structures necessary for student success.

College Access

To successfully compete in today's knowledge-based economy; every Ohio resident must have the ability to complete some level of postsecondary education. Education and training beyond high school not only fosters individual development but also helps ensure Ohio's economic future. Through a variety of programs, KnowledgeWorks Foundation helps more Ohioans access and complete postsecondary education and training.

Community Engagement

Schools must engage their communities, and communities must invest in their schools. In a growing number of communities across the country, this reciprocal relationship leads to more effective schools, healthier neighborhoods, and stronger civic life. At its best, community engagement brings *all* segments of the community together to discuss issues that affect a community's quality of life. KnowledgeWorks Foundation supports school-community alliances. Schools that engage their communities and serve as focal points for community activities achieve the school's academic mission but also support life-long learning in their communities.

Working together to improve education

KnowledgeWorks Foundation grounds our work in collaboration — connecting schools and communities; and connecting our work with researchers, practitioners, and education leaders across the country. The Foundation is committed to learning from and sharing lessons learned with others in Ohio and across the nation to help inform public policy. By transforming high schools, improving college and career access, and engaging the community, the Foundation will unleash the power of education to improve lives, communities, and society.

Our Mission

KnowledgeWorks Foundation will increase the number and diversity of people who value and access education, by creating and improving educational opportunity at pre-kindergarten through high school and post-high school institutions, and through community organizations.

Our Vision

KnowledgeWorks Foundation is committed to furthering universal access to high-quality educational opportunities for individuals to achieve success and for the betterment of society.

EDUCATIONSECTOR
Independent Analysis, Innovative Ideas

What We Believe

Students in America deserve a high-quality, publicly financed education through high school. They deserve the financial help necessary to attend high-quality colleges and universities. And they should be able to update their knowledge and skills throughout their lives. These educational opportunities are essential to participatory democracy, economic vitality, and robust civic life in the United States.

Our education system today serves a wider range of students more effectively than at any time in the past and the level of knowledge, skill, and commitment our nation's educators bring to their work is routinely underestimated. Educating students well is far more complicated and difficult than is commonly understood.

Yet our education system is not nearly as effective as it could and must be. It fails to challenge many students and it often fails to be the engine of opportunity that our increasingly diverse democracy and a competitive global economy requires. Despite much progress, we remain a nation deeply divided by race and class and our elementary and secondary and higher education systems contribute significantly to that troubling reality. America has sought in recent generations to be a meritocracy, but a lack of equal educational opportunity is undermining that goal. Some inequities result from long-standing disparities in educational resources. But many others result from systemic flaws that increased funding or modest reforms alone cannot address.

Meaningful improvement must start with a commitment to the notion that all students can learn to high standards. Poverty and other social problems make the work of educators more difficult. But economic and racial determinism have no place in American education. Educators must not calibrate their expectations to students' backgrounds; they must be expected to educate every student.

While students must learn to think critically and independently, there are specific skills and sorts of knowledge that schools and colleges should impart to all students.

We should create every opportunity for new ideas to flourish and for innovators to thrive in American education; it is time to rethink what public education is and who public educators are. Students' diverse needs are best served by a range of educational options. Consumer choice in education and competition among schools for students can help make such options available to more students. But such reforms must treat students equitably and provide for public accountability.

Education policies and practices should be based on sound empirical evidence. And educators, schools, and colleges should be held accountable and rewarded for their performance under measures that are fair and accurate.

Creating a sense of community, connectedness, and empowerment in schools is also critical to motivating students and teachers to do their best work. Too many students and teachers don't care because they don't feel cared about. There is a human side of school reform that is too often ignored.

These ideas guide our work.

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

THE CENTER FOR EDUCATION AT THE NATIONAL ACADEMY OF SCIENCES

The **Center for Education** (CFE) promotes evidence-based policy analysis that can help to improve education for all Americans. Formed as the locus for education activities in the National Academies, the Center is dedicated to engaging in work that is both *responsive* and *anticipatory:* responsive to government's and other stakeholders' program and research interests; and anticipatory of long-term challenges, opportunities, and needs that affect the future of education research and policy priorities. The Center brings together the nation's premier national, state, and local leaders from education, academe, industry and government to address critical national issues in education research, policy, and practice. Through studies, reports, workshops, websites and other activities, the Center informs many of the most critical issues facing education today: standards, assessment, teaching, technology, preparation of youth for productive futures, and the improvement of educational research.

The Center's work is carried out through the efforts of volunteer experts who serve on its constituted boards and committees including:

- The **Board on Testing and Assessment** which assists policymakers and the public by providing scientific expertise on critical testing and assessment issues in education, the workplace, and the armed services, in such areas as test policy, education reform, accountability, human resources planning and management, and technology for learning and teaching.
- The **Board on Science Education** which provides national leadership to policymakers, practitioners, and researchers on key issues in science education including learners at the preschool, K-12, undergraduate, graduate levels, as well as adult-centered science education and public understanding of science.
- The **Mathematical Sciences Education Board** which provides national leadership and evidence-based guidance for policies, programs, and practices supporting the improvement of mathematics education at all levels.
- The **Teacher Advisory Council** which brings the wisdom of practice of some of the nation's most accomplished classroom teachers to bear on issues relevant to high quality mathematics and science education at the national, state, and local levels.

For more information about the CFE, visit our web site at www.nationalacademies.org/cfe
For ordering information on and full-text access to CFE reports
visit the National Academy Press at www.nap.edu.

About the National Academies

For more than 100 years, The National Academies have provided independent advice on issues of science, technology, and medicine that underlie many questions of national importance. The National Academies, comprising the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council, work together to enlist the nation's top scientists, engineers, health professionals and other experts to study specific issues. The results of their deliberations have inspired some of America's most significant and lasting efforts to improve the health, education, and welfare of the nation.

National Education Knowledge Industry Association

"Using Knowledge for a Change"

The National Education Knowledge Industry Association (NEKIA) is a non-partisan national trade association for knowledge sector institutions in education. Through public policy and industry leadership, NEKIA advocates for evidence-based education and the effective use of knowledge in guiding policy and practice in k-12 education throughout the country. NEKIA's members are committed to high quality research, development, dissemination, technical assistance and evaluation at the federal, regional, state, tribal, and local levels.

NEKIA believes that effective knowledge use should be a central organizing theme of school improvement policies and practice across the country. NEKIA has established four principles upon which approaches to effective knowledge use should be based.

NEKIA's Principles for Effective Knowledge Use

Useable Knowledge --- Knowledge that is used to shape policy and practice should be derived from the best available empirical evidence and informed by sound professional judgment.

Key Stakeholders --- The effective use of knowledge in education requires the active participation of and the on-going collaboration among five key stakeholder groups: *Practitioners; Policymakers; Researchers; Developers and Providers; Intermediaries.*

Cumulative Process --- Effective knowledge use depends upon dynamic on-going exchanges of data and information among the stakeholders and involves a continuous process of research, application and adaptation. As knowledge is used and adapted, new knowledge is created and applied in a cumulative, iterative fashion.

High Priority Policy --- School improvement policies at the federal, state, and local levels should focus priority attention on the effective use of knowledge and create incentives to stimulate greater demand for and increased supply of knowledge-based solutions.

NEKIA Members

- **Academy for Educational Development**
- **American Institutes for Research**
- **Center for Research on Evaluation, Standards and Student Testing (UCLA)**
- **Center for Social Organization of Schools (Johns Hopkins University)**
- **Consortium for Policy Research in Education (University of Pennsylvania)**
- **Education Development Center**
- **The Education Alliance (Brown Univ.)**
- **Edvantia (formerly AEL, Inc)**
- **Laboratory for Student Success (Temple)**
- **Learning Point Associates**
- **Mid-continent Research for Education and Learning**
- **Northwest Regional Educational Laboratory**
- **Pacific Resources for Education and Learning**
- **PLATO Learning, Inc.**
- **RMC Research Corporation**
- **SERVE (UNC-Greensboro)**
- **Southwest Educational Development Laboratory**
- **WestEd**
- **WGBH Public Television**

Affiliates

- **Center for Equity and Excellence in Education (George Washington Univ.)**
- **College of Continuing Education (Univ. of Oklahoma)**
- **Collaborative for Teaching and Learning**
- **Metro Center for Urban Education (NYU)**
- **Nat'l Clearinghouse for Ed. Facilities**
- **Reading Recovery Council of America**

Contact: Jim Kohlmoos
1718 Connecticut Ave, #700 Washington DC 20009
Kohlmoos@nekia.org, http://nekia.org
202/518-0847