Chapter 1

Feedback at the System Level: Benchmarking U.S. Education Performance

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ABSTRACT: *This chapter examines the performance of the U.S. K–12 education system over time, in comparison to other nations, and at different levels of organizational structure: states, school districts, and schools. It uses macro-level, aggregate data to benchmark outcomes in four critical categories of performance: participation, quality, equity, and efficiency. It also reviews previous and current attempts at system-level feedback and accountability. The resulting picture portrays an education system that has never had adequate performance outcome data to guide its decisions. Recent efforts by No Child Left Behind (NCLB) to establish Adequate Yearly Progress (AYP) resulted in metrics that have no uniform standards and tremendous incentives for states to interpret data as positively as possible. Review of existing macro-level data from enrollment, graduation rates, standardized tests, demographics, and resource allocation databases describe a system failing in all four critical performance areas. The United States ranks below at least 20 nations in enrollment of eligible school-age children students and in high school graduation rates (participation). Slightly more than one third of students are proficient in reading and mathematics, while only 75% graduate from high school (quality). There is a wide disparity in student performance, quality of resources, and funding between students of color and socio-economic backgrounds (equity). And there seems to be little link between total resources spent and performance outcomes (efficiency).*

The value of a nation's education system is measured by how well it serves *all* of its children, not just those fortunate enough to attend a model school or live in a high-performing school district. While there are numerous examples of such exemplary schools and school systems in our country, this chapter portrays an education system that has been failing a significant majority of its students for decades. Part of this failure has been a lack of empirical, meaningful, and ongoing performance feedback at the system level. This chapter examines our nation's history of evaluating educational progress, identifies critical performance outcomes for an effective education system, and provides a snapshot of how our nation is performing against those benchmarks.

Education is increasingly referred to as the civil rights issue of our generation. Few social institutions have more impact on the health and well-being of a nation's citizenry. As a culture, we hold the assumption, codified in federal and state laws, that all students have access to an equal and effective education. Yet we have not systematically evaluated our progress toward this goal. The recent focus on high-stakes testing is a start, but only one piece of the puzzle. While academic test scores represent one critical performance outcome, an effective egalitarian education system must do much more. A broader set of outcomes was proposed by the Organisation for Economic Co-operation and Development (OECD), which has studied education systems across nations since the early 1960s. It concluded, "Governments need to create education systems that are accessible to everyone, not just a favoured few; that are globally competitive on quality; that provide people from all classes a fair chance to get the right kind of education to succeed; and to achieve all this at a price that the nation can afford…Put another way, this volume defines superior performance as high participation, high quality, high equity, and high efficiency" (Organisation for Economic Co-operation and Development [OECD], 2011).

This chapter analyzes our education system's performance in these four areas: (a) *participation* (how well our education system serves *all* school-age children); (b) *quality* (how well it meets identified educational goals); (c) *equity* (how fairly it allocates resources and achieves comparable outcomes across all categories of students); and (d) *efficiency* (how well it invests its resources in terms of achieving stated outcomes). There is now data that make it possible to benchmark our progress on these outcomes over time and against other educational systems.

A key element of benchmarking is the identification of critical performance indicators. Without such indicators, it is impossible to evaluate the effectiveness of our education system or make sound decisions about school reform initiatives. Indicators need to be *reliable* (repeated measures of the same event yield the same score), *valid* (they measure what we think they are measuring), and *socially relevant* (the outcomes reflect society's values). To make matters more challenging, both process measures and outcome measures are needed. Without process measures (treatment integrity) to tell us if education interventions are being implemented as designed, it is virtually impossible to draw conclusions. And, finally, outcome measures need to be collected on the performance of *all* aspects of the education system: students, staff, and organizations.

An effective education system requires meaningful and accurate feedback data for evaluating education performance at both a micro level (individual student and staff performance) and a macro level (system performance at different units of scale, i.e., school, district, state, and nation). This chapter examines our performance at the macro level. There exists a wealth of macro data on the education system's overall performance across time that sheds light on our performance in the areas of participation, quality, equity, and efficiency. We just haven't been using it to drive policy decisions.

METRICS FOR BENCHMARKING EDUCATIONAL PERFORMANCE OUTCOMES AT A MACRO LEVEL

Benchmarking education performance at the macro level has its limitations. The scale of measurement is large. The indicators often reflect the aggregation of data from multitudinous units of performance. Drawing conclusions about specific causal relations becomes very challenging as the data may consist of performance averages, include the cumulative impact of numerous interventions, and reflect snapshots in time (e.g., annual data). And given the scale of the analysis, changes in performance often move slowly, not unlike a large ocean-going vessel changing course. However, macro indicators represent critical performance outcomes, as ultimately an education system must be measured by the overall sum of its parts. It does matter how all the students are performing, especially when equity is important. And while there are limitations to which conclusions can be drawn, this chapter presents an overwhelming preponderance of evidence showing an education system in crisis. By virtually every macro indicator, we are failing the goals of high participation, high quality, high equity, and high efficiency.

There is an increasing amount of macro-level data being generated that can be used to benchmark an education system's critical performance outcomes. As the balance of this chapter will reference these resources, it is worth taking some time to discuss their relative strengths and weaknesses.

Standardized tests

Education stakeholders are in a constant debate about what constitutes a quality education and how best to measure student outcomes. In particular, there is significant disagreement about the use and value of high-stakes standardized tests. Both their validity (what they measure) and reliability (how well they measure) are often disputed when applied at the micro level (evaluating individual students or teachers). Despite these questions, standardized tests provide extremely valuable student performance measures at the macro level over time. They may not measure every desired education achievement, but they can assess one of the system's most important outcomes: what students have learned in selected content areas (e.g., reading, math). And while some of the standardized tests used in different states and localities may merit criticism from validity and reliability perspectives, there are national and international standardized tests that meet the highest standards of reliability, validity, and social relevance. Data from these tests provide a clear and unambiguous picture of how well the U.S. education system is educating students on selected measures. These national and international tests include the following:

National Assessment of Educational Progress (NAEP): NAEP has often been called the gold standard for standardized academic testing because of its constant rigorous scrutiny (National Center for Education Statistics [NCES], 2010a). Established in 1964, with the first tests administered in 1969, NAEP provides a continuing assessment of what American students know and can do in math, reading, science, writing, the arts, civics, economics, geography, and U.S. history. NAEP is administered by the National Center for Education Statistics (NCES), a division of the Institute of Education Sciences in the U.S. Department of Education. Panels of technical experts within NCES and other organizations continually scrutinize tests for reliability and validity, keeping them similar from year to year and documenting changes. It is one of the only common metrics for all states, providing a picture of student academic progress over time.

Program for International Student Assessment (PISA): PISA is a carefully constructed and well-documented test instrument for measuring student academic performance across nations (Organisation for Economic Co-operation and Development [OECD], 2006). Coordinated by the Organisation for Economic Co-operation and Development, this international study has been conducted every 3 years since 2000. It measures the performance of 15-year-old students in 64 countries (34 member nations and 30 participating nations) in reading, mathematics, and science. In addition to reporting on test scores, PISA collects data on a large number of education system characteristics and identifies statistical correlations between results and selected variables.

Graduation rates

Few performance indicators have more significant social relevance than high school graduation rates. Research data from 2005–07 show that high school dropouts have a 50% higher unemployment rate than high school graduates (U.S. Bureau of Labor Statistics, 2013), earn 50% less income (U.S. Census Bureau, 2011), are 44% more likely to be in less than very good health (Egerter et al., 2009), and 530% more likely to be incarcerated (Sum, Khatiwada, McLaughlin, & Palma, 2009). Yet, there has been a significant lack of valid and reliable data collected, analyzed, and reported at any level of the education system (school, district, state, national). Historically, some states failed to produce any graduation rate data whatsoever (Hall, 2005). Those that did often failed to account for students who left school prior to the 12th grade, dramatically skewing the data (Hall, 2005). This changed in 2011 with the new federal guidelines establishing a "four-year adjusted cohort graduation rate" (U.S. Department of Education, 2008). Prior to that, there have been other models that attempted to capture reliable historical data. The following have been used to obtain historical performance data in this metric:

<u>Four-Year Adjusted Cohort Graduation Rate (Cohort Graduation Rate):</u> The 4-year adjusted cohort graduation rate is the number of students who graduate in 4 years with a regular high school diploma divided by the number of students who entered high school 4 years earlier. It was adopted in 2008, when the U.S. Department of Education enacted regulations establishing a uniform and more accurate measure for calculating the rate at which students graduated from high school. Starting in the 2010–11 school year, the 4-year adjusted cohort graduation rate captures all students, including those who drop out in earlier grades. Above all, it is a metric that is uniform across all 50 states and can be used over time (U.S. Department of Education, 2008).

<u>Average Freshman Graduation Rate (AFGR):</u> Prior to implementation of the Adjusted Cohort Graduation Rate, the NCES developed a model for estimating graduation rates using enrollment data that accounted for students who were enrolled in the ninth grade but did not finish school. Based on a technical review and analysis, the AFGR was selected as the most accurate indicator from a number of alternative estimates that can be calculated using available cross-sectional data (Stillwell, Sable, & Plotts, 2011).

<u>Cumulative Promotion Index (CPI):</u> The CPI uses enrollment and diploma-count data from the U.S. Department of Education to approximate the probability that a student entering the ninth grade will complete high school on time with a regular diploma. It averages the percentage of students who successfully transition between grades (from 9 to 10, 10 to 11, and 11 to 12) to generate a graduation rate that is inclusive of all students. It is used by the Editorial Projects in Education (*Education Week*), Harvard Civil Rights Project, Urban Institute, and Education Commission of the States, among other groups. While it is not a true cohort, it is recognized as an accurate estimate (Hall, 2005).

Education system databases

A tidal wave of macro-level data on education system performance is being generated annually at all levels of the system: school, school district, state, national, and international. These data are increasingly useful in benchmarking the performance of systems against each other and over time. A sample of these databases include:

The Condition of Education: Published annually by the NCES, *The Condition of Education* reports important developments and trends in education, including 49 indicators on the status and condition of education. The 2012 report examined data in three main areas: (a) participation in education; (b) elementary and secondary education and outcomes; and (c) postsecondary education and outcomes. It has been published annually since 1989, providing over 20 years of data with which to benchmark education performance at the system level in this country (Aud et al., 2012).

Digest of Educational Statistics: Published annually by the NCES, the *Digest of Educational Statistics* provides a compilation of statistical information covering the broad field of American education from pre-kindergarten through graduate school. The digest contains data on a wide variety of topics across all levels (students, staff, organization) relating to enrollment rates, educational attainment, student and family demographics, teacher characteristics, finances, and instruction. It has been published annually since 1962, providing over 50 years of data with which to benchmark education performance at the system level in this country (Snyder & Dillow, 2012b).

Education at a Glance: Produced annually by the OECD Centre for Educational Research and Innovation, *Education at a Glance* has become a leading international compendium of comparable national statistics measuring the state of education worldwide. The report analyses the education systems of the 34 OECD member countries, as well as those of 30 participating countries. It looks at who participates in education, the level and type of resources committed, how education systems operate, and the results achieved. The last includes indicators on a wide range of outcomes, from comparisons of student performance in key subject areas to the impact of education on adults' earnings and chances of employment. It has been published since 1998, providing data with which to benchmark the performance of the United States against other nations (Organisation for Economic Co-operation and Development [OECD], 2012a).

Return on Investment Analyses

Benchmarking requires more than comparative performance data. It also requires analysis of a system's use of resources in relation to what works and what doesn't. In a time of diminishing resources it becomes more critical than ever to identify interventions that produce the best results the most efficiently. Simply spending more money on education will not necessarily produce better outcomes. There are extremely well-funded school districts that are failing, and less well-funded districts that are succeeding. The question becomes: Which interventions secure the best outcomes with the most cost-effective use of resources? To answer this question, a number of education systems are utilizing return on investment (ROI) analyses. A measure of how efficiently resources are producing results, ROI is a formula in which the benefit of an investment is divided by its costs. It has long been used in the world of business but historically has been resisted in the field of education. This is changing. ROI analyses are increasingly showing up in both education research and operations. In addition to a growing number of well-designed studies on this issue (reviewed later in this chapter), public education systems are beginning to track ROI as part of their ongoing school reporting measures. For example, Florida has developed an online individual school report card that documents performance and ROI for each school and school district in the state.

A HISTORY OF "FLYING BLIND"

Prior to No Child Left Behind (NCLB), the only education performance data that the federal government required individual states to report were data on student dropout rates. Any other production of education performance outcome data was left up to each state. The result was a hodgepodge of 50 different accountability systems that had one thing in common: They seldom met the standards of reliability, validity, and social relevance. State achievement tests varied significantly in terms of rigor, frequency, grade levels assessed, subject matter tested, and cut scores (the selected score that separates test takers into various categories, such as a passing score and a failing score). Test formats often changed, preventing comparison of one year with another. Formulas for calculating graduation rates (when they were reported at all) were as creative as they were inaccurate. This absence of reliable and valid feedback contributed to reform efforts that relied on opinion, philosophy, ideology, and fads. This lack of data contributed to the failure of our nation's education system to improve over the past 40 years. The road to implementing reliable and valid performance outcome metrics has been rocky.

The first serious attempt to implement reliable and valid metrics on a national scale occurred just over a decade ago. In 2001, NCLB attempted to enforce accountability standards through the concept of Adequate Yearly Progress (AYP), which among other provisions required each state to adopt and report high-stakes academic testing scores and high school graduation rates. The flaw in the plan was the absence of uniform standards. States were allowed to select their own tests, develop their own standards and proficiency cut scores, establish their own annual targets, and define their own formulas for graduation rates. Most of the pre-NCLB flaws remained in place. Except now there were significant consequences for failing to meet AYP targets (schools faced increasing sanctions leading up to a massive overhaul of site leadership and staff), which gave states enormous incentives to report data in as flattering a way as possible. As will be seen, this variability showed up all levels: overall AYP calculations, standardized tests, and graduation rates.

AYP variability

One study demonstrated the inconsistency of the AYP metric across different states (Cronin, Dahlin, Xiang, & McCahon, 2009). It took actual performance data from 36 randomly selected schools (18 elementary schools and 18 middle schools) located around the country and applied the AYP standards from 28 different states to see how individual schools would fare in different states. The results for elementary schools are reflected in Figure 1:

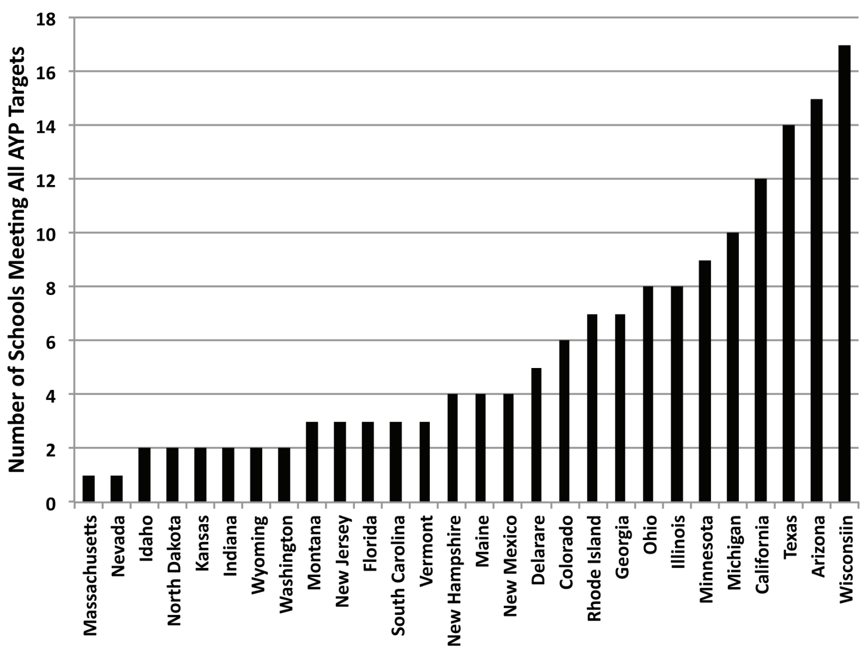

Figure 1. How individual schools fared using AYP criteria of 28 different states.

Adapted from *The Accountability Illusion* (p. 21), by J. Cronin, M. Dahlin, Y. Xiang, and D. McCahon, 2009, Washington, DC: Thomas B. Fordham Institute. In the public domain.

The data show great inconsistency between the AYP standards of different states, with some states having significantly more stringent requirements than others. When the study applied the AYP criteria adopted by Massachusetts or Nevada, only 1 of the 18 elementary schools met those states' targets. On the more lenient end of the continuum was Wisconsin, where 17 of these same 18 elementary schools met the AYP criteria. The remaining 25 states would have certified between 3 and 15 schools. This level of inconsistency clearly raises questions about the reliability, validity, and social relevancy of the AYP metric in the absence of uniform standards. Yet, AYP has been a cornerstone accountability measure for one of the most significant school reform initiatives in history.

Further scrutiny of AYP variability takes us to an analysis of two of its major components: state standardized testing and graduation rate data. Fortunately, there are established metrics for a benchmark analysis of each.

High-stakes academic testing variability

One of NCLB's fundamental goals is that *all* children will be "proficient" in reading and math by 2014.

As with AYP, states have very different standards for establishing cut scores and identifying which students meet "proficiency" in a given subject area. NCES generates ongoing research that compares NAEP proficiency standards against those of individual states. Figure 2 compares the percentage of students who met proficiency for fourth-grade reading according to various state tests versus the percentage of the same students who met proficiency according to NAEP results. The states are ranked from largest to smallest gap between state and NAEP standards.

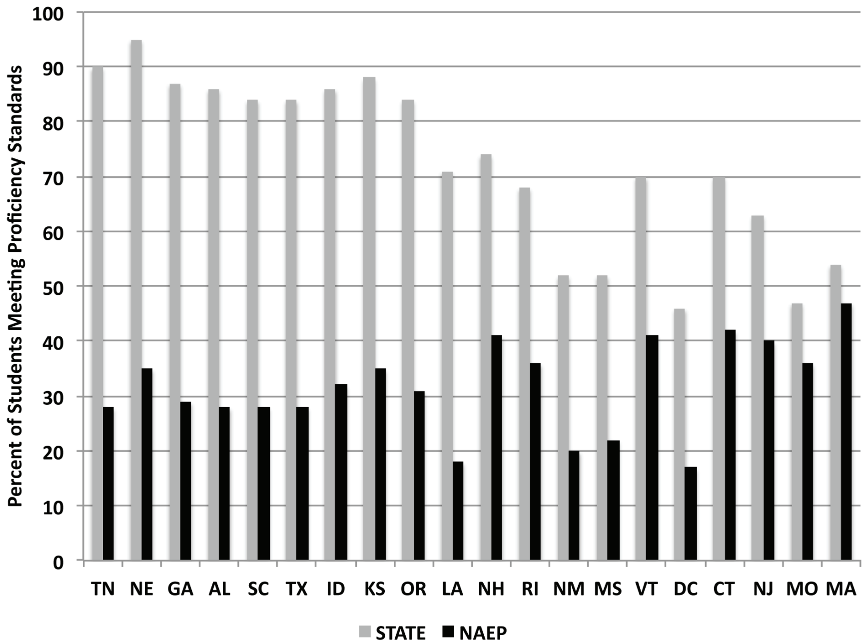

Figure 2. Percent of students meeting proficiency standards for state test versus NAEP test (reading fourth grade, 2009).

Data are drawn from National Center for Education Statistics (NCES) (2011f).

The data show a dramatic disconnect between the proficiency standards of states and those of NAEP. For example, Tennessee reported that 90% of its fourth-grade students were at or above reading proficiency. NAEP data for Tennessee reported only 28%. Similar gaps occurred across the other states analyzed. Only in Massachusetts were state test results comparable to NAEP's (54% to 47%). Comparable gaps existed across grades and in mathematics as well as reading. The following table analyzed the average proficiency outcomes for all states and the District of Columbia compared to their NAEP proficiency rates for the same students.

Table 1.
Average fourth- and eighth-grade reading and math scores (state testing versus NAEP), 2009

	Reading		**Mathematics**	
	Grade 4	**Grade 8**	**Grade 4**	**Grade 8**
% students reported as proficient using state proficiency standards	74	72	73	66
% students reported as proficient using NAEP proficiency standards	32	31	39	33
% difference in proficiency	42	41	34	33

Data are drawn from National Center for Education Statistics (NCES) (2011f).

On average, in 2009, states reported twice as many students proficient in reading and math than did NAEP. As with AYP, these data also demonstrate significant inconsistency between states. But given the integrity of the NAEP testing process, the data also suggest that many states established tests or cut scores that artificially inflated student achievement. Relying on such inaccurate data makes it very difficult for states to draw the right conclusions about progress in their education systems.

NCES examined state proficiency standards in the context of NAEP's three achievement levels, or benchmarks, for student performance: "*Advanced*" represents superior performance, "*proficient*" represents solid academic performance, and "*basic*" denotes partial mastery of prerequisite knowledge and skills fundamental for proficient work at each grade. (NAEP also reports data on students who are *"below basic*"). "*Proficiency*" becomes a critical benchmark because it is the level at which students have met the standards for a subject area. It is also the benchmark by which NCLB holds school districts accountable (National Center for Education Statistics [NCES], 2011c).

NCES concluded that most state proficiency standards were not just below NAEP's proficiency levels, but were actually at or below NAEP's definition for *basic* performance. A sample of the findings include:

- In fourth-grade reading, 35 of the 50 states included in the analysis set standards for *proficiency* (as measured on the NAEP scale) that were lower than the scale score for *basic* performance on NAEP. The remaining 15 states' *proficiency* standards were in NAEP's *basic* range. This meant that most states identified students as proficient readers when they were actually below partial mastery of reading skills.
- In fourth-grade mathematics, 7 of the 50 states included in the analysis set standards for *proficiency* (as measured on the NAEP scale) that were lower than the scale score for *basic* performance on NAEP, 42 were in NAEP's *basic* range, and 1 in NAEP's *proficient* range. Again, state standards were much lower than NAEP standards.

(Bandeira de Mello, 2011)

Graduation rate variability

The other AYP pillar of evaluation—graduation rates—has long been considered an important metric for measuring education progress. Yet, until recently there has been no established uniform standard for calculating this metric. Unfortunately, as with testing, NCLB provided states with serious incentives to report high graduation rates and maximum flexibility on how they calculated the rates. The results showed a clear pattern of misusing standards and data to overstate graduation rates. For example, very few states included students who dropped out prior to the 12th grade. North Carolina used a calculation based on the percentage of graduates who got their diplomas in 4 years or less, ignoring the number of students who dropped out. New Mexico reported only the percentage of 12th graders who graduated, ignoring students who dropped out in the 9th, 10th, and 11th grades. Alaska's graduation rate was based on the number of students who graduated divided by the number of students enrolled on the last day of school (Hall, 2005).

These standards produced data that were not an accurate reflection of actual graduation rates. How inaccurate was this representation? Figure 3 displays the five states with the greatest discrepancy between state-reported data and data from two more accurate graduation-rate models (CPI and AFGR).

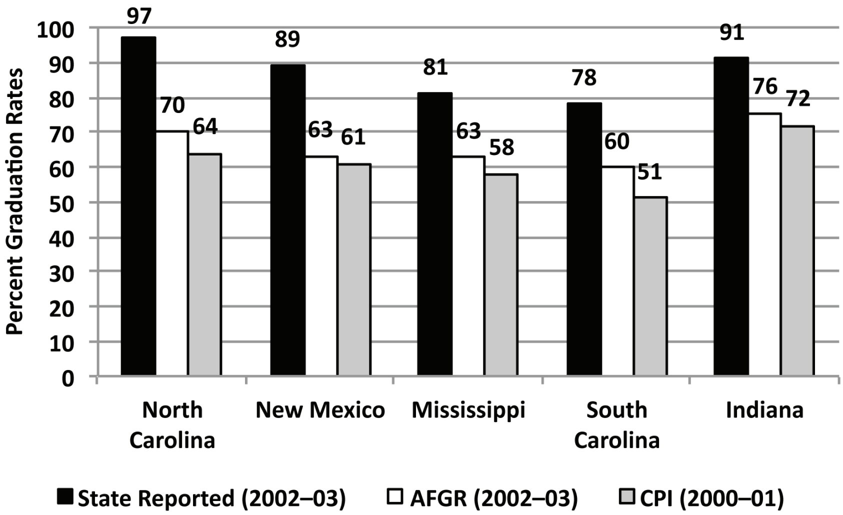

Figure 3. Comparison of state-reported, AFGR, and CPI graduation rates.

CPI = the Cumulative Promotion Index calculation was for the previous year (2000–01), but is still relevant because graduation rates do not change much from year to year. AFGR = the Average Freshman Graduation Rate is generated by the NCES. It calculates the number of regular diplomas issued in a given year divided by the average enrollment base for the freshman class 4 years earlier. Data are drawn from Hall (2005, p. 5) and Synder and Dillow (2012a).

The difference is dramatic. In school year 2002–03 North Carolina reported that 97% of its students graduated, whereas the more accurate calculations placed the number at between 64% and 70%. New Mexico reported a graduation rate of 89%, compared to more accurate figures in the low 60% range. The pattern was repeated for most states. For many states, these discrepancies were even greater when data were disaggregated by race. North Carolina reported a graduation rate for African-American students of 95% versus CPI's calculation of 54%; a graduation rate for Latino students of 94% versus CPI's calculation of 58%; and a graduation rate for Native American students of 96% versus CPI's calculation of 34% (Hall, 2005).

If you don't know where you are going…

The balance of this chapter documents our nation's significant investment in education and its failure to produce desired outcomes in virtually all the identified benchmark categories. Certainly, there are many reasons for this failure. However, it is hard to imagine one more important than our history of "flying blind." Given the absence of systemic education performance metrics that are based on consistent measures and standards, it is no wonder that education reform has foundered for almost 40 years. We simply never had meaningful performance outcome data to know how we were doing or what was working.

BENCHMARKING PERFORMANCE OUTCOMES IN EDUCATION

Despite the challenges of implementing reliable, valid, and socially relevant performance metrics at state and local levels, the performance of our overall national education system can be benchmarked over time and against those of other industrialized nations. The first question is that of social relevancy. What are the crucial performance outcomes for an education system? In benchmarking the education performance data from its participating countries, OECD identified the following four critical outcomes for a high-performing education system:

High participation: Almost all the system's students are in high school at the appropriate age and complete the requisite course work for a diploma/degree.

High quality: The system's average student performance is high using well-established national standards as well as international standards. The education system continually makes significant progress in improving student performance.

High equity: The education system delivers high-quality learning consistently to all students in all schools so that every student benefits from excellent academic opportunities. Education resources are equally distributed across schools regardless of students' ethnicity or socio-economic status.

High efficiency: Academic achievement is high relative to per-pupil spending (return on investment).

The following analyses use available macro data to benchmark the performance outcomes of the U.S. education system in the areas of participation, quality, equity, and efficiency.

High participation benchmark

Children need to attend school if they have any hope of benefiting from school. They also need to complete high school (referred to as upper secondary school by most nations). This section examines the comparative performance data on the percentage of students participating in education at both later ages (15 to 19) and early ages (3 and 4). It also reviews the data on those who complete high school.

Participation rates

OECD tracks data on the percentage of children enrolled in education by age group. Two particular age groups are highlighted in this analysis: (a) 15- to 19-year-olds and (b) 3- and 4-year olds. Tracking students 15 to 19 years of age is another way of assessing an education system's success in serving students through completion of high school. Table 3 displays data on 30 OECD member and participating nations for 2010. The United States ranked 24th in the percentage of 15- to 19-year-olds enrolled in school.

Table 2.
OECD enrollment rates for ages 15 to 19 in 2010

Rank	Nation	% Enrolled	Rank	Nation	% Enrolled
1	Ireland	95.7	16	South Korea	85.9
2	Belgium	93.3	17	Slovak Republic	85.3
3	Poland	92.7	18	Switzerland	85.1
4	Slovenia	91.8	19	Denmark	85.0
5	Hungary	91.7	20	Spain	84.3
6	Netherlands	90.7	21	France	84.2
7	Czech Republic	90.2	22	Greece	83.4
8	Germany	89.5	23	Italy	83.3
8	Iceland	87.8	**24**	**United States**	**81.7**
10	Saudi Arabia	87.1	25	Australia	81.4
11	Finland	86.8	26	Canada	80.8
12	Estonia	86.5	27	New Zealand	79.1
13	Portugal	86.4	28	Austria	78.4
14	Sweden	86.4	29	United Kingdom	77.4
15	Norway	86.3	30	Luxembourg	76.7

Note: Canada's data are from 2009. Luxembourg's data are underestimated because many resident students go to school in neighboring countries.

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The other participation age range analyzed is that of ages 3 and 4. According to OECD, "Early childhood education is associated with better performance later on in school. Fifteen-year-old pupils who attended pre-primary education perform better on PISA than those who did not, even after accounting for their socio-economic backgrounds" (OECD, 2012a). Full enrollment in education (defined by OECD as enrollment rate exceeding 90%) begins between the ages of 3 and 4 in half of OECD countries. Table 4 displays data for 30 OECD member and participating nations in 2010. The United States ranked 26th in the percentage of 3- and 4-year-olds enrolled in school that year.

Table 3.
OECD enrollment rates for ages 3 and 4 in 2010

Rank	Nation	% Enrolled	Rank	Nation	% Enrolled
1	France	100.0	16	Israel	82.6
2	Spain	99.0	17	Hungary	82.2
3	Belgium	98.9	18	South Korea	80.2
4	Iceland	95.8	19	Portugal	79.5
5	Norway	95.7	20	Austria	75.1
6	Italy	94.8	21	Czech Republic	72.5
7	Germany	92.4	22	Russian Federation	71.1
8	Denmark	92.3	23	Mexico	69.4
9	Sweden	92.0	24	Ireland	66.9
10	New Zealand	90.5	25	Slovak Republic	66.5
11	United Kingdom	90.0	**26**	**United States**	**59.9**
12	Estonia	89.2	27	Chile	56.5
13	Japan	86.1	28	Argentina	55.3
14	Luxembourg	84.5	29	Poland	52.5
15	Slovenia	83.7	30	Finland	51.7

Note: Canada's data are from 2009. Luxembourg's data are underestimated because many resident students go to school in neighboring countries.

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Graduation rates

One of the best sources of data for measuring student participation in the U.S. education system is the percentage of students who graduate from high school each year. The Average Freshman Graduation Rate (AFGR) data paint a grim picture in this benchmark category. In the 2008–09 school year, almost 25% of all freshman students (one in four) starting high school in 2004–05 nationwide failed to complete high school graduation requirements. This translated to 1 million students failing to earn a diploma in 2009. In addition to documenting extremely poor performance, the data show very little improvement over the last 18 years (Figure 4).

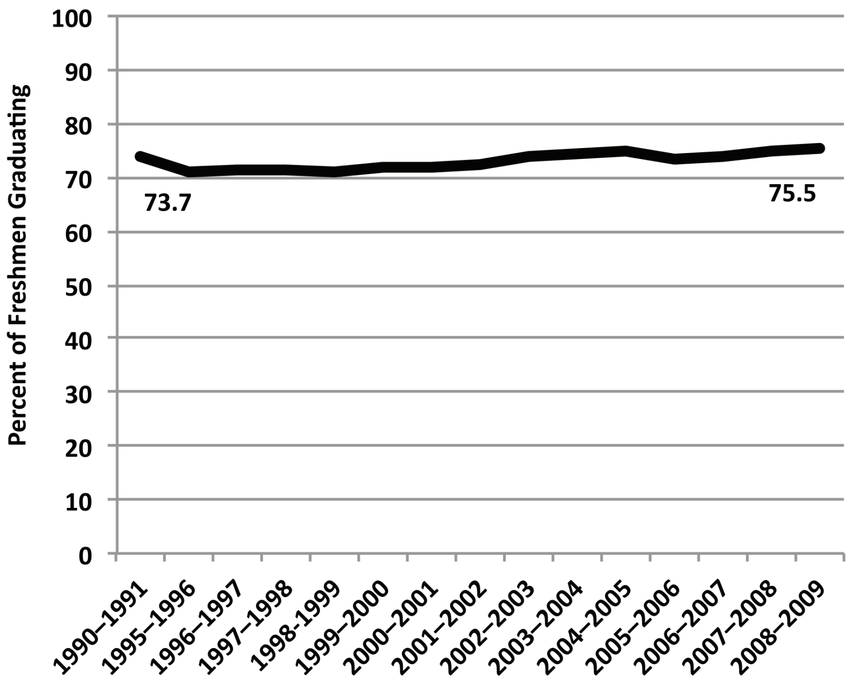

Figure 4. Percent of freshman graduating from public high schools in all states and the District of Columbia, 1991–2009.

Data are drawn from Snyder and Dillow (2012a).

As will be seen repeatedly in this chapter, performance data vary dramatically from state to state. Graduation rates are a prime example. In 2008–09, AFGR in individual states ranged from 56.3% in Nevada and 62% in Mississippi to 89.6% in Vermont and 90.7% in Wisconsin (Stillwell et al., 2011).

At the international level, OECD provides data that allow for the comparison of upper secondary (equivalent to high school in the United States) graduation rates across nations. Table 4 displays data for 26 of OECD's 34 member nations in 2010. The United States ranked 22nd in graduation rate.

Table 4.
OECD upper secondary (high school) graduation rates, 2010

Rank	Nation	% Grad. Rate	Rank	Nation	% Grad. Rate
1	Portugal	104.0	14	Slovak Republic	85.6
2	Japan	95.6	15	Hungary	85.5
3	Greece	94.1	16	Poland	83.5
4	South Korea	93.9	17	Chile	83.3
5	Slovenia	93.8	18	Italy	83.2
6	Ireland	93.7	19	Canada	80.5
7	Finland	93.3	20	Spain	80.4
8	Israel	91.8	21	Czech Republic	79.2
8	United Kingdom	91.6	**22**	**United States**	**76.8**
10	Iceland	87.8	23	Sweden	74.8
11	Norway	87.2	24	Luxembourg	69.7
12	Germany	86.5	25	Turkey	54.2
13	Denmark	86.2	26	Mexico	47.0

Note: 1. Portugal's 104% graduation rate is an exceptional and temporary situation following the implementation of the "New Opportunities" initiative in that country. Many individuals went back to school and have now graduated from this program. 2. Canada's data are from 2009.

Adapted from *Education at a Glance 2012: OECD Indicators* (p. 53), by the Organisation for Economic Co-operation and Development, 2012, Paris: Organisation for Economic Co-operation and Development. Copyright 2012 by Organisation for Economic Co-operation and Development.

The graduation rates of participating nations increased by an average of 8 percentage points since 1995 (OECD, 2012a). During that same period, the United States' graduation rate increased by only 4.5 percentage points. (Snyder & Dillow, 2012a)

High participation benchmark review

The macro data make it clear that the U.S. education system scores very poorly in the high participation benchmark. The preponderance of evidence is overwhelming:

- When compared with other developed nations, in 2010 the United States ranked 24th in enrollment of 15- to 19-year-olds, 26th in enrollment of 3- and 4-year-olds, and 22nd in high school graduation rate.
- Twenty-five percent of U.S. students do not graduate from high school.
- The variability in graduation rates among states is dramatic, ranging from 56.3% to 90.7%.
- There has been little or no progress in this metric for as far back as reliable data go.

High quality benchmark

As discussed previously, standardized testing represents one of best, and perhaps only, empirical quality indicators for measuring student academic performance at the macro level. The NAEP and PISA tests provide data across a range of subjects and ages. This benchmark analysis focuses specifically on reading and mathematics.

Student performance data (NAEP)

The richest set of student achievement data come from NAEP, which provides data on subject matter achievement in two ways: scale scores (long-term trend assessment) and achievement levels (main NAEP assessment). The long-term trend assessment makes available test data in mathematics and reading going back to 1970, with test scores by age (9, 13, and 17). The main NAEP assessment reports test results on 12 different subject areas going back to 1992, with student data by grade (4, 8, and 12).

Scale scores provide a numeric summary of what students know and can do in a particular subject and are presented for groups of students. NAEP scale scores for reading and math range from 0 to 500. Figures 5 and 6 display NAEP scale scores from 1971 through 2008 for reading and 1978 through 2008 for mathematics. They show a remarkable lack of student progress in reading and mathematics over the last 40 years. This "flat line" performance occurred despite numerous and significant school reform initiatives (*A Nation at Risk*, Goals 2000, NCLB).

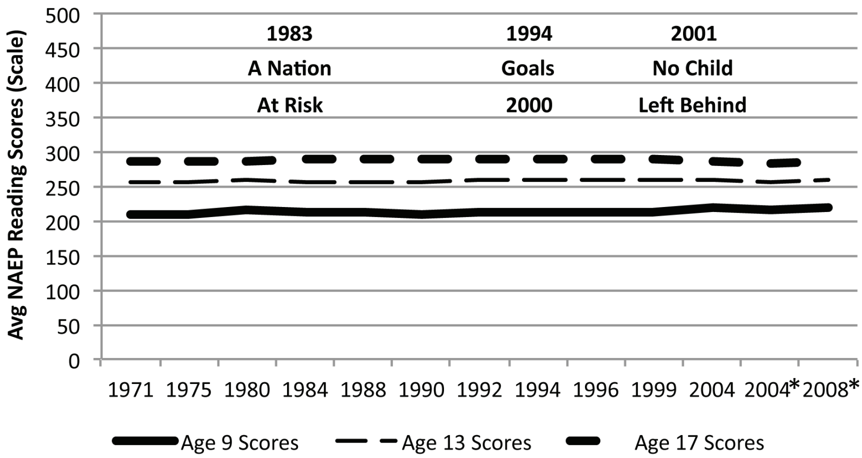

Figure 5. NAEP reading scores, long-term trend assessment, 1971–2008.

Data are drawn from National Center for Education Statistics (NCES) (2011a). *Test formats were changed in 2004. Both old and new test formats were reported for that year. Year 2008 used the new format.

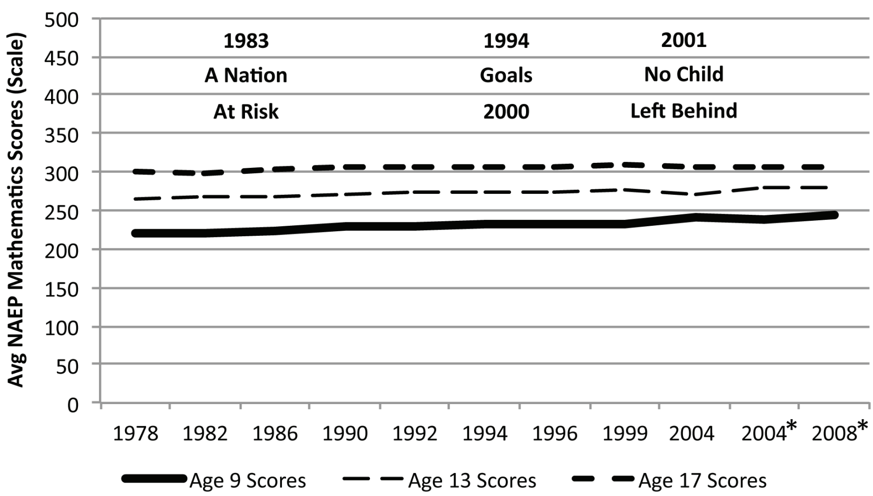

Figure 6. NAEP mathematics scores, long-term trend assessment, 1978–2008.

Data are drawn from National Center for Education Statistics (NCES) (2011a). *Test formats were changed in 2004. Both old and new test formats were reported for that year. Year 2008 used the new format.

Flat scale scores would be acceptable, and even desirable, if the scores reflected high levels of proficiency in the subject matter, but this was not the case. NAEP achievement data can be analyzed to identify the percentage of students at a given grade level who were at or above proficiency. Again, "proficiency" means that students at this level have demonstrated competency over challenging subject matter for their grade level. "Below proficiency" means that students have only partial mastery. Figure 7 shows the percentage of fourth-grade children who could read at or above proficiency level from 1992 through 2011.

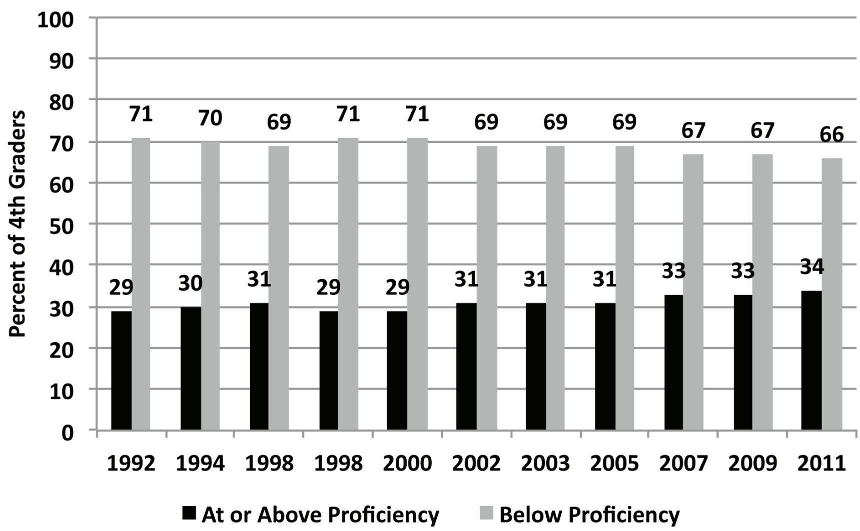

Figure 7. Percent of fourth graders reading at or above proficiency, 1992–2011.

Adapted from *The Nation's Report Card: Reading 2011* (p. 10), by the National Center for Education Statistics, 2011, Washington, DC: U.S. Department of Education. In the public domain.

In 2011, only one third of fourth-grade students read at or above proficiency level, which represents only a 5 percentage point improvement since 1992. This is particularly problematic as research tells us that children who fall significantly behind in reading at an early age have a very small chance of making up the difference (OECD, 2012a). Fourth-grade reading proficiency data varied significantly across states, with New Mexico and Mississippi having the lowest percentages of proficient readers at 20% and 22%, respectively, in 2011. The state with the greatest percentage of proficient readers was Massachusetts, with 51% (National Center for Education Statistics [NCES], 2011e).

The data did not improve significantly when it came to the percentage of 12th-grade students who read at or above proficiency (Figure 8).

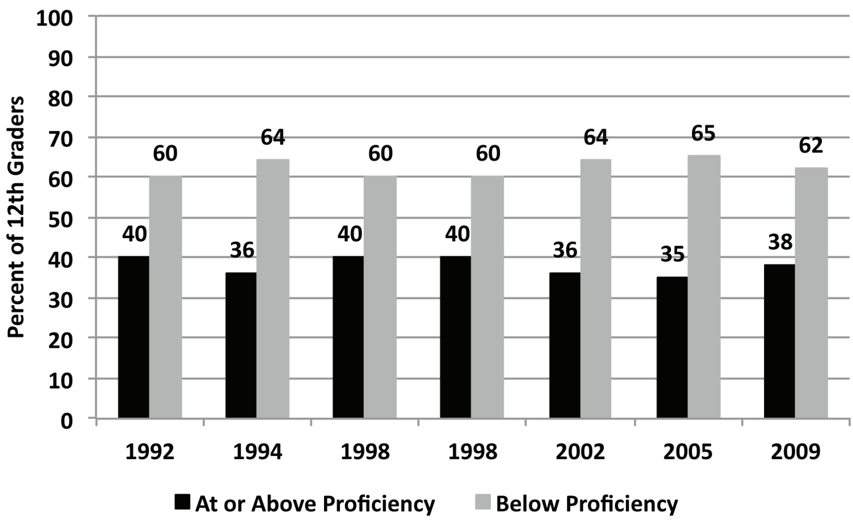

Figure 8. Percent of 12th graders reading at or above proficiency, 1992–2009.

Adapted from *The Nation's Report Card: Grade 12 Reading and Mathematics 2009 National and Pilot State Results* (p. 9), by the National Center for Education Statistics, 2010, Washington, DC: U.S. Department of Education. In the public domain.

Only 38% of 12th-grade students were reading at or above proficiency in 2009, a decrease in performance from 1992, when 40% were reading at that level. While 12th-grade achievement data historically has not been collected at the state level, 11 states volunteered to participate in a pilot program in which their test scores were reported separately (National Center for Education

Statistics [NCES], 2010b). Once again, individual states had widely differing performances. West Virginia (29%), Arkansas (30%), and Florida (32%) scored the lowest percentages of readers at or above proficiency in grade 12, and New Hampshire (44%) and Massachusetts (46%) scored the highest percentages (NCES, 2010b).

NAEP achievement levels in mathematics painted a very similar picture. While a significant improvement in test scores for fourth graders occurred between 2000 and 2007, there was little change subsequently, with performance leveling out at 39% to 40% proficiency (Figure 9).

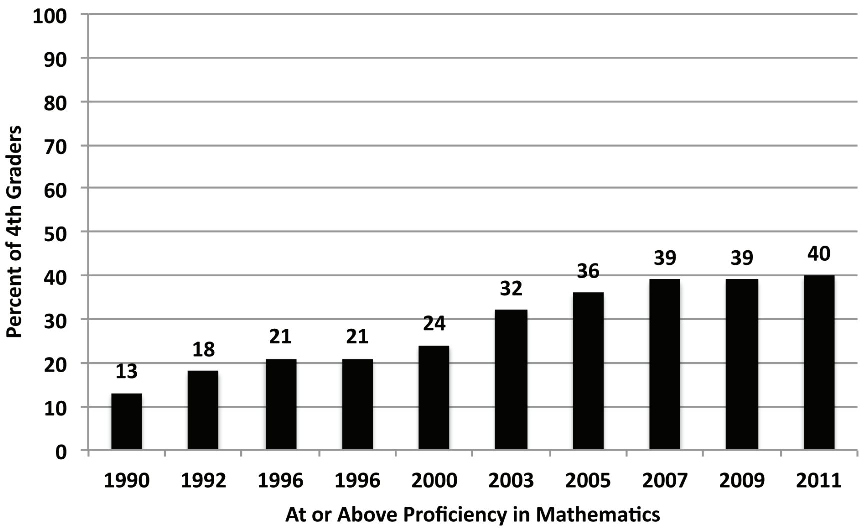

Figure 9. Percent of fourth graders at or above proficiency in mathematics, 1990–2011.

Adapted from *The Nation's Report Card: Mathematics 2011* (p. 11), by the National Center for Education Statistics, 2010, Washington, DC: U.S. Department of Education. In the public domain.

Mathematics achievement data for 12th-grade students is available only for 2005 and 2009, as a change in the mathematics framework for the assessment necessitated a new trend line at that grade level. Only 23% percent of 12th graders performed at or above proficiency in 2005, and 26% in 2009 (NCES, 2010b). As with reading, the only individual state data came from the 11 state pilot programs in 2009. The performance of individual states varied widely, just as they did in reading achievement. West Virginia (13%) and Arkansas (15%) had the lowest percentage of 12th-grade students at or above proficiency in mathematics, while New Hampshire (32%) and Massachusetts (36%) had the highest (NCES, 2010b).

Student performance data (PISA)

PISA test results are a second source of student performance outcome test data. In 2009, they showed the United States trailing 13 nations in reading, 16 nations in science, and 24 nations in mathematics (Table 5). PISA now has test scores over 10 years that highlight changes in performance. The United States' reading test scores actually dropped by 5 points between the 2000 and 2009 PISA tests while its science scores improved by 5 points between 2003 and 2009, but neither change was statistically significant. Its science scores increased by 13 points between 2006 and 2009, which was considered statistically significant (Organisation for Economic Co-operation and Development [OECD], 2010a).

Table 5.
2009 PISA reading, science, and mathematics scores

Rank	Reading		Science		Mathematics	
1	South Korea	539	Finland	554	South Korea	546
2	Finland	536	Japan	539	Finland	541
3	Canada	524	South Korea	538	Switzerland	534
4	New Zealand	521	New Zealand	532	Japan	529
5	Japan	520	Canada	529	Canada	527
6	Australia	515	Estonia	528	Netherlands	526
7	Netherlands	508	Australia	527	New Zealand	519
8	Belgium	506	Netherlands	522	Belgium	515
9	Norway	503	Germany	520	Australia	514
10	Estonia	501	Switzerland	517	Germany	513
11	Switzerland	501	United Kingdom	514	Estonia	512
12	Poland	500	Solvenia	512	Iceland	507
13	Iceland	500	Poland	508	Denmark	503
14	**United States**	**500**	Ireland	508	Slovenia	501
15			Belgium	507	Norway	498
16			Hungary	503	France	497
17			**United States**	**502**	Slovak Republic	497
18					Austria	496
19					Poland	495
20					Sweden	494
21					Czech Republic	493
22					United Kingdom	492
23					Hungary	490
24					Luxembourg	489
25					**United States**	**487**

Adapted from *PISA 2009 Results: What Students Know and Can Do–Student Performance in Reading, Mathematics and Science (Volume I)* (p. 15), by the Organisation for Economic Co-operation and Development, 2010, Paris: Organisation for Economic Co-operation and Development. Copyright 2010 by Organisation for Economic Co-operation and Development.

High quality benchmark review

While there is much debate about the components of a quality education system, the acquisition of core reading and mathematics skills is perhaps the most important. If students are not gaining proficiency in critical academic skills, nothing else much matters. Although standardized test scores have their detractors, they do measure this critical benchmark. The preponderance of evidence is overwhelming:

- NAEP scores for both reading and mathematics have not improved since the inception of the tests in the late 1960s, despite significant education reform efforts.
- NAEP achievement scores identifying proficiency levels in reading and mathematics have also shown very little to no improvement since their inception in the early 1990s, with the exception of a jump of 16 points in fourth-grade math scores between 2000 and 2011 (from 24% at or above proficiency to 40%).
- The most recent NAEP reading achievement test scores showed that only 34% of 4th-grade students (2011) and 38% of 12th-grade students (2009) were at or above proficiency level in reading.
- The most recent NAEP mathematics achievement test scores revealed that only 40% of 4th-grade students (2011) and 26% of 12th-grade (2009) students were at or above proficiency levels in mathematics.
- The United States ranked 14th in reading and 25th in mathematics among OECD nations on PISA test scores in 2009.

The results from our two most reliable and valid tests—NAEP and PISA standardized tests—overwhelmingly support the premise that the United States is failing the high quality benchmark.

High equity benchmark

The high equity benchmark can be analyzed in two areas: (a) the relationship between learning outcomes and students' ethnicity/socio-economic background and (b) whether or not there is equal access to resources (quantity and quality) in all schools regardless of ethnicity/socio-economic conditions.

Equity in learning outcomes

ETHNICITY

Benchmark data suggest that in the U.S. education system there is significant inequality in learning outcomes for children of particular ethnicities (Black, Hispanic, American Indian) and from lower socio-economic backgrounds. This conclusion is reinforced by multiple measures: graduation rates, dropout rates, and NAEP test scores.

The AFGR disaggregates high school graduation rates by various ethnicities. Figure 10 highlights the differences in graduation rates.

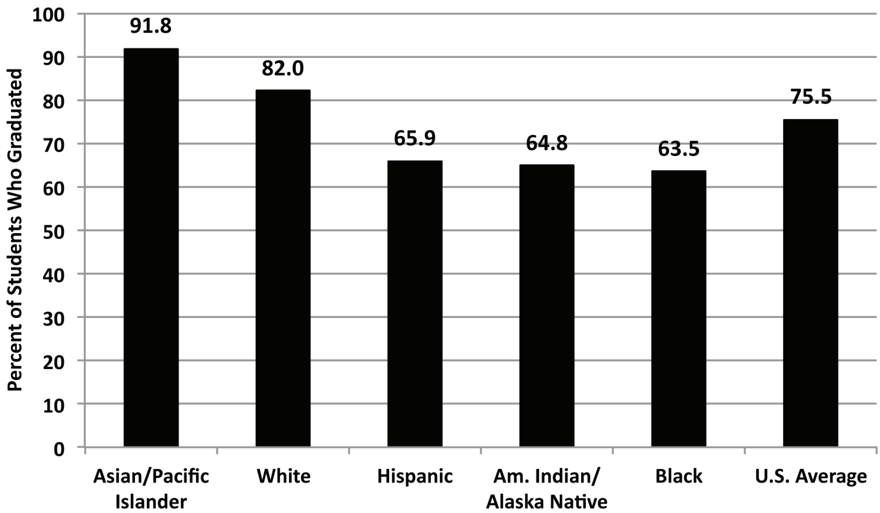

Figure 10. High school graduation rate by ethnicity, 2008–09.
Data are drawn from Stillwell, Sable, and Plotts (2011, pp. 8–9).

Graduation rate data show a clear link between learning outcomes and ethnicity. The graduation rate for Black, Hispanic, and American Indian/Alaska Native students averaged 64.8% in 2008-09, 11 percentage points lower than the national average and 17 percentage points lower than the average for White students. As with other data, graduation rates varied significantly from state to state.

- Black students: On a national scale, only 63.5% of Black students graduated from high school. Some of the larger states reported even worse performances: California, 57.7%; New York, 58.1%; Ohio, 56.8%; and Florida, 59.8%.
- Hispanic students: Only 65.9% of Hispanic students graduated nationally. The District of Columbia graduated only 50.1% of its Hispanic students, and several states didn't do much better: Connecticut, 55.5%; Georgia, 56.6%; and New York, 57.4%. New Hampshire fared the worst, graduating only 41.6% of Hispanic students.

- American Indian/Alaska Native students: Students of this ethnicity had an overall graduation rate of 64.8%. Among the worst performing states were Wyoming, 45%; Mississippi, 49.3%; and Washington state, 51.3% (Stillwell et al., 2011).

Another metric that demonstrates inequality in learning outcomes is the number of students who drop out of school. Figure 11 displays the relative dropout rates by ethnicity for the 2008–09 school year. Black, Hispanic, and American Indian/Alaska Native students were more than twice as likely to drop out of school as White students. Once again, there was significant disparity in the outcome data among ethnicities.

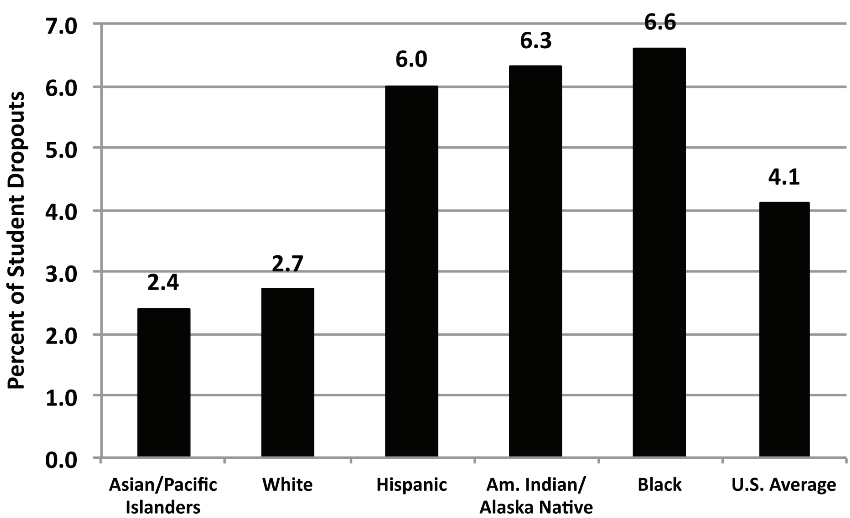

Figure 11. Dropout rates by ethnicity, 2008–09.
Data are drawn from Stillwell, Sable, and Plotts (2011, pp. 16–17).

NAEP achievement test data can also be disaggregated by ethnicity. Figures 12 and 13 track NAEP reading proficiency for 4th- and 12th-grade students by race/ethnicity over a 19-year period.

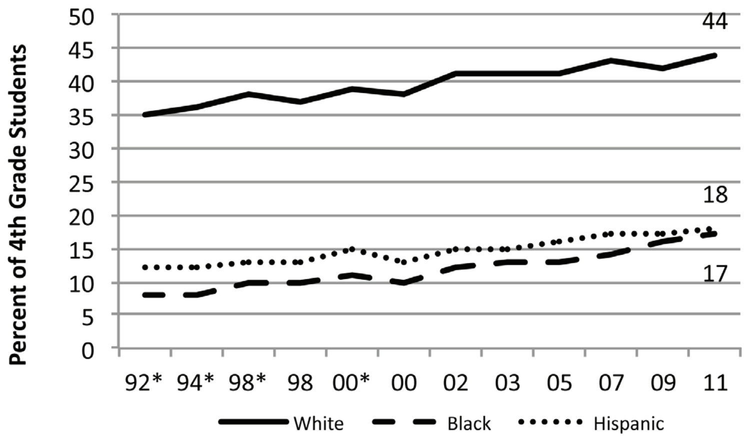

Figure 12. NAEP fourth-grade reading proficiency by race/ethnicity, 1992–2011.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011b). *Accommodations were not permitted for this assessment.

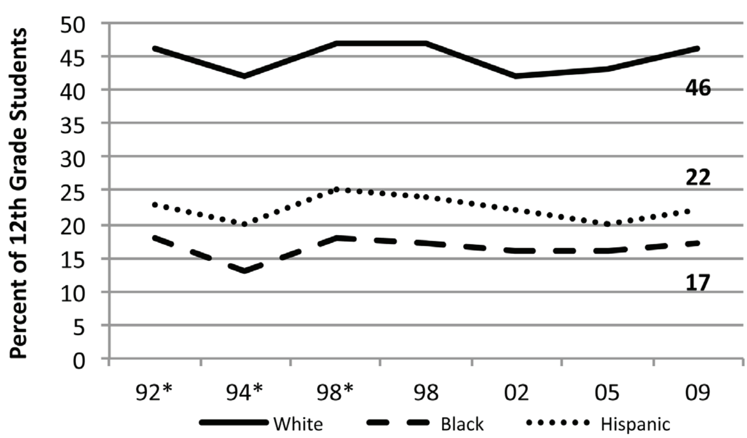

Figure 13. NAEP 12th-grade reading proficiency by race/ethnicity, 1992–2009.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011b). *Accommodations were not permitted for this assessment.

The data show obvious gaps in reading proficiency among ethnicities over the years. For comparison purposes, the most recent observations refer to 2009 data as there were no 2011 statistics for 12th-grade reading.

- In 2009, there was a significant gap in fourth-grade reading proficiency between White (42%) and Black (16%) students (a difference of 26 percentage points), and between White (42%) and Hispanic (17%) students (25 percentage points).
- The gap did not narrow for 12th-grade students in 2009. The reading proficiency gap between White (46%) and Black (17%) students was 29 percentage points, and between White (46%) and Hispanic (22%) students 24 percentage points.
- The gaps have remained virtually constant over the testing years going back to 1992. In 1992, the fourth-grade reading proficiency gap between White (35%) and Black (8%) students was 27 percentage points, and between White (35%) and Hispanic (12%) students 23 percentage points. In 1992, the 12th-grade reading proficiency gap between White (46%) and Black (18%) students was 28 percentage points, and between White (46%) and Hispanic (23%) students 23 percentage points.

Figures 14 and 15 track NAEP mathematics proficiency over a 21-year period by race/ethnicity for fourth graders, and a 4-year period of time for 12th graders (the NAEP mathematics test was changed significantly in 2005 limiting comparisons to earlier test scores).

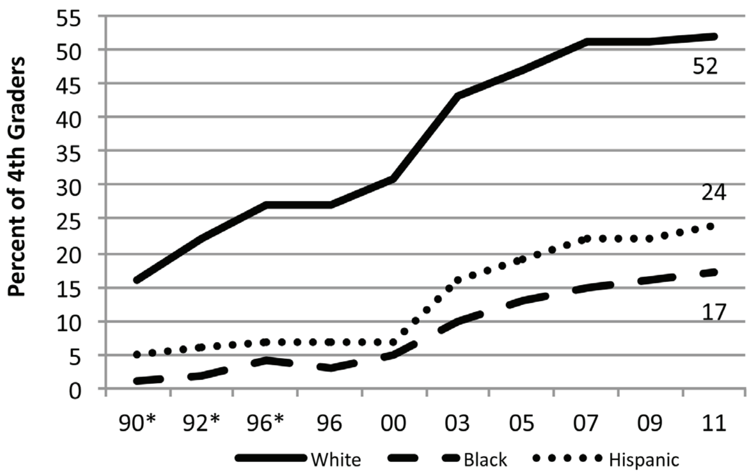

Figure 14. NAEP fourth-grade math proficiency by ethnicity, 1990–2011.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011a). *Accommodations were not permitted for this assessment.

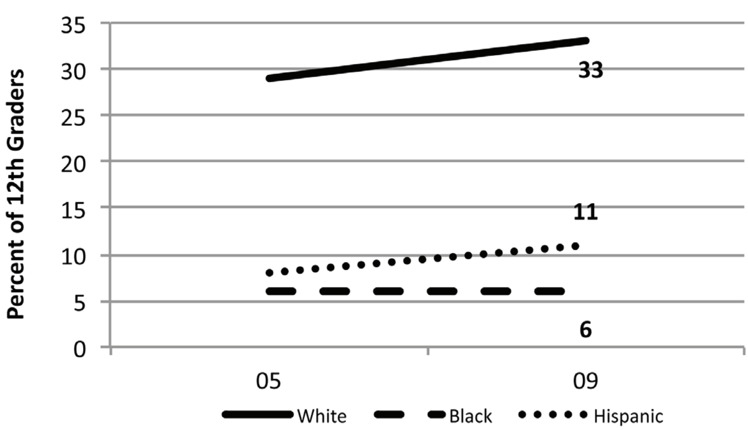

Figure 15. NAEP 12th-grade math proficiency by race/ethnicity, 1992–2009.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011a). *Accommodations were not permitted for this assessment.

The 2009 mathematics proficiency data show performance gaps between ethnicities, and they're even larger than the gaps in reading proficiency data. For comparison purposes, 2009 data is used because, as in the case of 12th-grade reading, there were no 2011 statistics for 12th-grade math.

- There was a significant gap in fourth-grade math proficiency between White (51%) and Black (16%) students (a difference of 35 percentage points), and between White (51%) and Hispanic (22%) students (2 percentage points).
- The gap in 12th-grade math proficiency narrowed slightly between White (33%) and Black (6%) students (a difference of 27 percentage points), and between White (33%) and Hispanic (11%) students (22 percentage points).
- The gaps between ethnicities have widened over time. In 1990, the fourth-grade math proficiency gap between White (16%) and Black (1%) students was 15 percentage points, and between White (16%) and Hispanic (5%) students 11 percentage points. In 2005, the 12th-grade math proficiency gap between White (29%) and Black (6%) students was 23 percentage points, and between White (29%) and Hispanic (8%) students 21 percentage points.

All of the learning outcomes macro-level data (graduation rates, dropout rates, NAEP reading and math scores) overwhelmingly support the conclusion that in the United States there is significant inequity in learning outcomes based on ethnicity.

SOCIO-ECONOMIC STATUS

While graduation rate data are not disaggregated by socio-economic indicators, student dropout data are. The following benchmark indicators (Figures 16 and 17) examine dropout rates in the context of family income, dividing income levels into four quartiles (lowest to highest). These data show an alarming trend in inequity in learning outcomes based on socio-economic background.

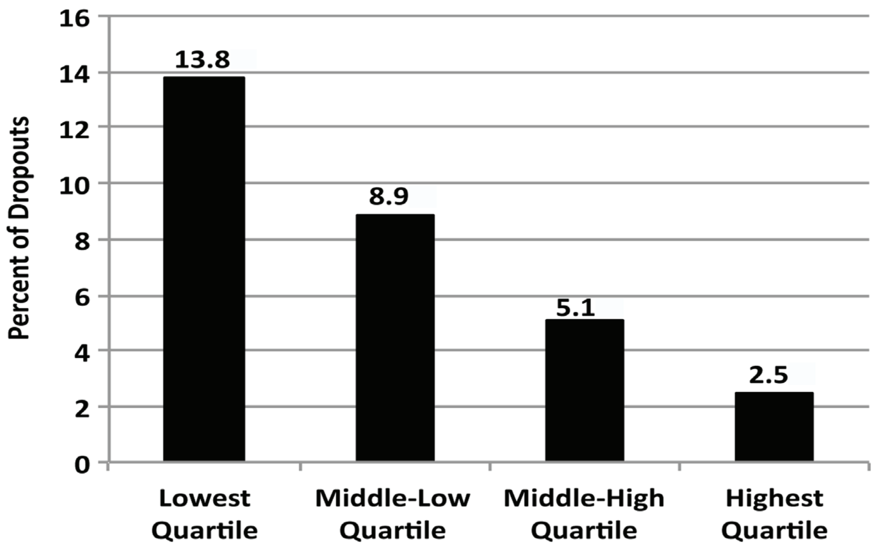

Figure 16. Dropout rate by family income (2010) (lowest quartile to highest quartile).

Data are drawn from Snyder and Dillow (2012b, p. 183).

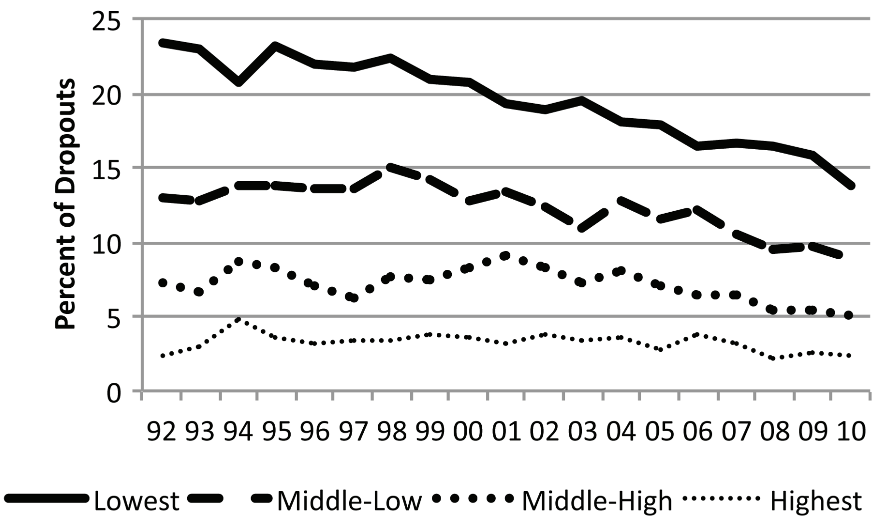

Figure 17. Dropout rate by family income, 1992–2010.

Data are drawn from Snyder and Dillow (2012b, p. 183).

The relationship could not be clearer. Children from families of the lowest socio-economic status are more likely to drop out of high school than children of families with higher incomes, and the relationship follows each quartile proportionately. Children from the lowest income quartile are five times more likely to drop out of school than children from families in the highest income quartile (Figure 16). The trend from 1992 to 2010 (Figure 17) does show a narrowing of the gap, but the linear relationship between family income and dropout rate remains the same.

NAEP achievement scores can also be disaggregated by socio-economic status. One way of identifying a student's socio-economic background is whether or not the student qualifies for the National School Lunch Program (also referred to as the free or reduced-price lunch program, or FRLP). Children may qualify for either free or reduced-price lunch based on family income; free lunch eligibility represents the lowest income families. Figures 18 and 19 chart the reading and mathematics proficiency of fourth-grade students in these three categories: eligible for free lunch, eligible for reduced-price lunch, and not eligible for either.

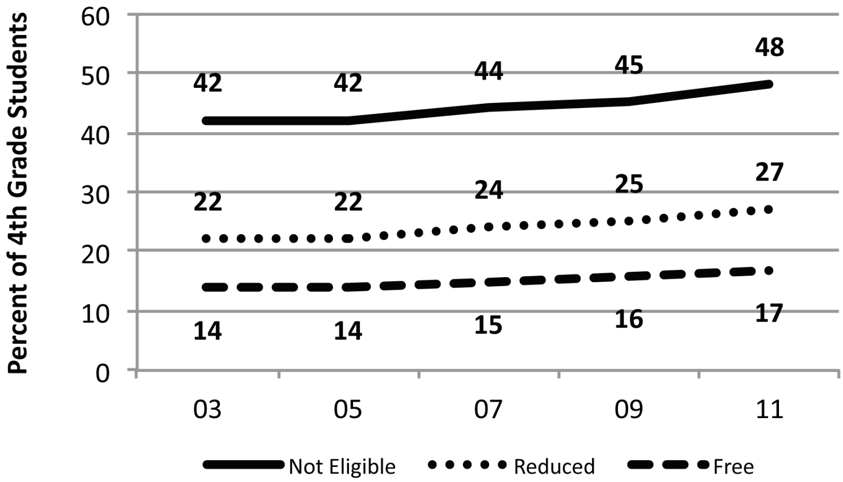

Figure 18. NAEP fourth-grade reading proficiency by eligibility for free and reduced-price lunch program, 2003–11.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011b).

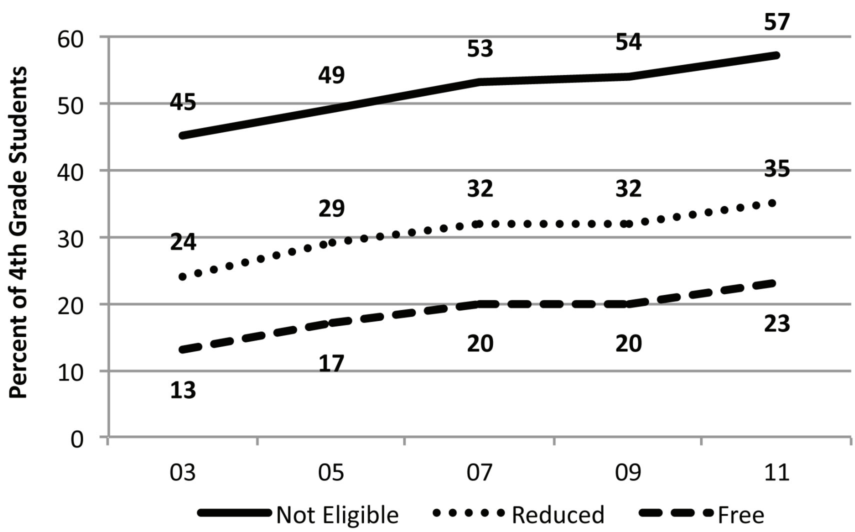

Figure 19. NAEP fourth-grade math proficiency by eligibility for free and reduced-price lunch program, 2003–11.

Data are drawn from National Assessment of Educational Progress (NAEP) (2011a).

The NAEP achievement data show a similar pattern of continuous, significant gaps in reading and mathematics proficiency based on student socio-economic status.

The most recent reading test scores (2011) reported a difference of 21 percentage points between fourth-grade students of the highest socio-economic status and those of the mid-level. The gap between fourth graders of the highest and the lowest socio-economic rankings was 31 percentage points.

Math achievement scores in 2011 showed even larger gaps: 22 percentage points between fourth-grade students of the highest socio-economic status and those of the mid-level, and 34 percentage points between fourth-grade students of the highest and lowest socio-economic rankings.

The gaps between fourth-grade students of different socio-economic statuses in both reading and math proficiency have worsened over time. In 2003, the gap in reading proficiency between students of highest and mid-level socio-economic rankings was 20 percentage points, and between highest and lowest 28 percentage points. In 2003, the gap in math proficiency between highest and mid-level was 21 percentage points, and between highest and lowest 32 percentage points.

The NAEP data demonstrate that a student's socio-economic status remains one of the most significant predictors of academic proficiency.

PISA data can also be analyzed across socio-economic status, using the same metric as the NAEP data: students who qualify for FRPL (free or reduced-price lunch program). Their analysis examined test scores by individual schools and the percentage of students in the school who qualified for FRPL. The lower the percentage of students qualifying for FRPL, the higher the socio-economic status of the student population. Figure 20 examines PISA test scores using this metric.

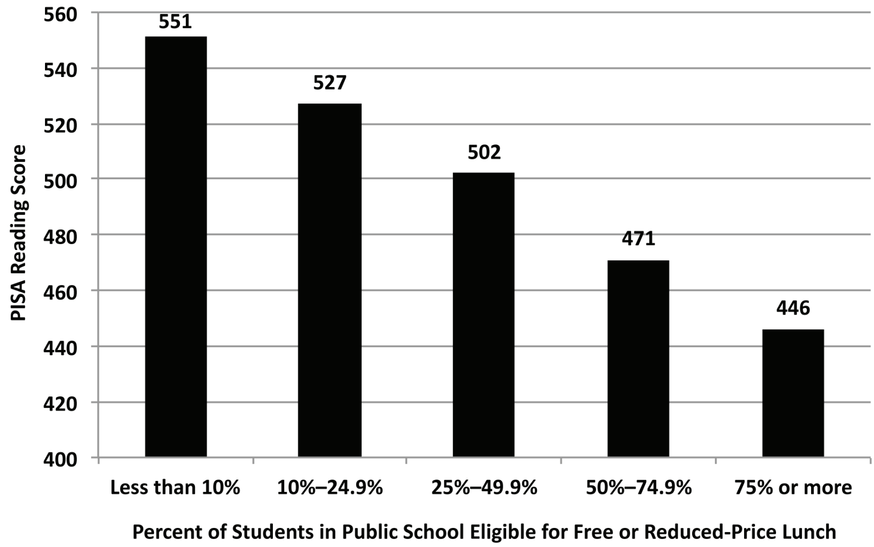

Figure 20. PISA reading scores by socio-economic status, 2009. Data are drawn from Fleischman, Hopstock, Pelczar, and Shelley (2010, p. 15).

The PISA data show the same link between student performance and socio-economic status. Schools with less than 10% of students qualifying for FRPL had average scores that were 105 points higher than schools with 75% or more FRPL students. As with previous data, the consistently linear nature of the relationship between student performance and socio-economic background is remarkable.

PISA conducted detailed analyses of member and participating countries, examining the degree to which student performance in reading was related to socio-economic background.

The first analysis looked at the amount of variance in reading test scores that were attributable to the socio-economic status of individual students. PISA found that 17% of the variance in individual student performance in the United States was attributable to socio-economic background. Using this metric, in 2009 the United States ranked 9th of 34 OECD countries in reading, and 22nd among 64 reporting countries (Organisation for Economic Co-operation and Development [OECD], 2010b).

The second PISA analysis looked at the variance in student reading performance that was attributable to socio-economic background differences between schools. Were these variances spread across schools or clustered within schools? In other words, was there a disproportionate concentration of lower performing students, who were also of lower socio-economic status at the school level? PISA found that in the United States the between-school student performance variance explained by the socio-economic makeup of schools was nearly 80%. In 2009, the United States ranked 31st of 33 OECD countries and 61st out of 63 reporting countries (OECD, 2010b).

The between-school variance highlights one of the most challenging—and growing—demographic characteristics of public education in the United States: an increasing segregation of students by socio-economic conditions resulting in disadvantaged schools (high-poverty) and advantaged schools (low-poverty).

This trend of increasing segregation of students by socio-economic status is confirmed by National Center for Education Statistics (NCES). Figure 21 describes the percentage of public schools by poverty level based on FRPL data. High-poverty schools are defined as public schools in which more than 75% of the students are eligible for the FRPL program; mid-high poverty, in which 51% to 75% are eligible; mid-low poverty, in which 26% to 50% are eligible; and low-poverty, in which 25% or less are eligible.

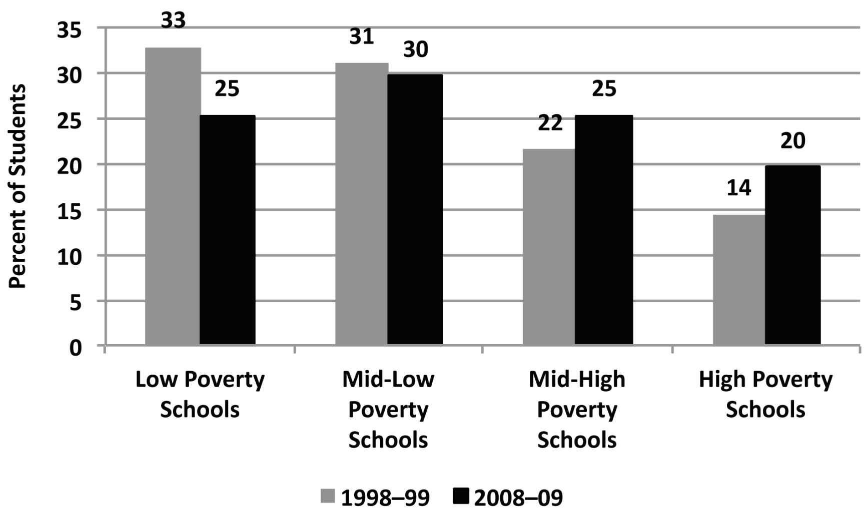

Figure 21. Percent of public schools by student poverty level, 1998–99 and 2008–09.

Data are drawn from Aud, Hussar, Kena, Bianco, Frohlich, Kemp, and Tahan (2011, p. 238).

The data reflect two alarming trends. First, in 2008–09, almost half of the schools were at the mid-high to high poverty levels, and one fifth at high-poverty, or 75% or greater FRPL participation. This spread illustrates a clustering of students from high-poverty families within a school. Second, this trend has increased over a 10-year period. In 1998–99, only 14% of schools were at the high-poverty classification. Over the next 10 years, this figure increased by more than a third, to 20%.

NCES data also show disproportionality in the ethnic makeup of low-poverty versus high-poverty schools. Figures 22 and 23 show the ethnic composition of students attending low-poverty schools versus high-poverty schools.

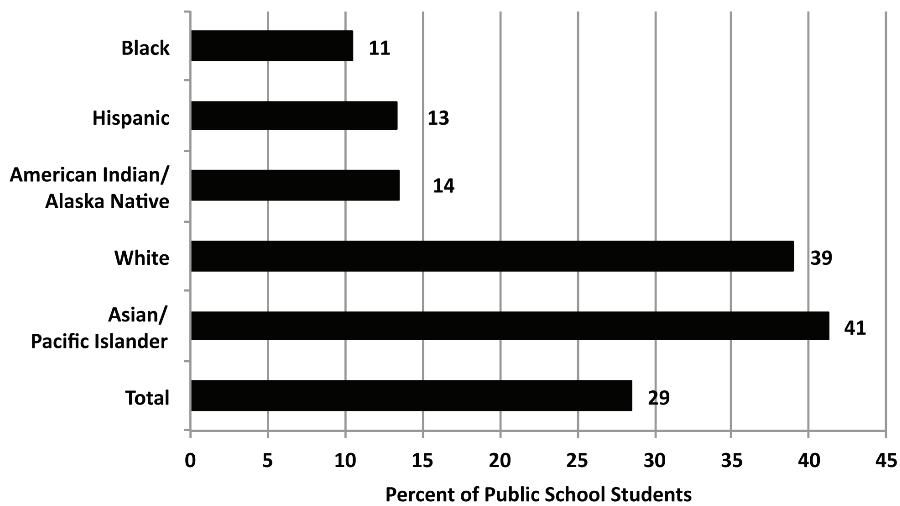

Figure 22. Percent of ethnic groups in student population in low-poverty schools in 2008–09.

Data are drawn from Aud, Hussar, Kena, Bianco, Frohlich, Kemp, and Tahan (2011, p. 240).

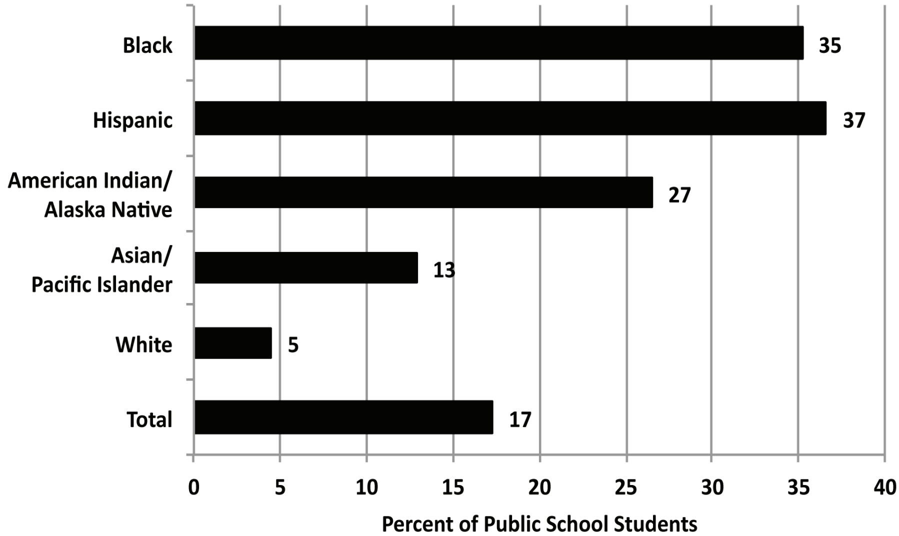

Figure 23. Percent of ethnic groups in student population in high-poverty schools in 2008–09.

Data are drawn from Aud, Hussar, Kena, Bianco, Frohlich, Kemp, and Tahan (2011, p. 240).

High-poverty schools have disproportionately high percentages of Hispanic (37%) and Black (35%) students and a disproportionately low percentage of White students (5%). This feature is reversed when examining low-poverty schools: The percentage of White students is disproportionately high (39%), and the percentages of Hispanic (13)%, and Black (11%) students disproportionately low. A separate study concluded the following: “One in thirty white students and less than a tenth of Asian students, but 40% of black and Latino students attend schools where 70-100% of the children are poor” (Orfield, 2009). The clustering of lower socio-economic non-White students in individual schools (and often school districts) has a significant impact in funding and resource equity, as will be seen in the next section.

Student performance metrics show a clear inequity in learning outcomes related to ethnicity and socio-economic status. As children who are Black, Hispanic, American Indian, or from lower socio-economic families have the same learning potential as all children, there must be discrepancies in learning opportunities and resources to produce these results. The relationship between ethnicity and poverty, and the clustering of high-poverty students in individual schools suggests that the issue of equal access to resources plays a role.

The following discussion begins to answer the question of how inequity in learning outcomes happened.

Equity in access to resources

Effective allocation of education resources is one of the most critical tools an education system has to address the educational needs of society. Two resources stand out as the most critical: funding and high-quality educators. These resources have to be allocated efficiently and—just as important—equitably to address the differing needs of a student population. It is no easy task.

Funding for our nation's K–12 education system is highly decentralized, complicated, and capricious. It is decentralized in that each individual state has the responsibility to establish its own state school finance system with rules, regulations, and policies that establish school-funding formulas. The system is complicated because funding of public schools is divided among federal (8.2%), state (48.3%), and local (43.5%) governments, and each funding source has its own rules and guidelines (Education Finance Statistics Center [EDFIN], 2009). And, as will be seen, the system is capricious because funding results in significant disparities across a wide range of units of analysis—in 2009–10, across 13,629 school districts and 98,817 public schools in 50 states (Snyder & Dillow, 2012b). Rather than dissect the Byzantine labyrinth of these formulas, this section will look at the resulting funding levels using the following benchmarks: (a) funding effort; (b) funding equity across states, school districts, and public schools; and (c) funding progressivity.

FUNDING EFFORT

While research and experience suggest that spending more money on education by itself does not necessarily improve education outcomes (as will be seen later), the level of resources committed to education does matter and is an important benchmark. It is a reflection of the commitment a society makes to education, and, if used wisely, can result in higher student performance. The level of resources metric also allows a system to compare its efficiency and effectiveness with those of other education systems and with itself over time. Annual per-pupil spending (PPS) data can be benchmarked across various system levels (nation, state, school district), as a proportion of a nation or state's wealth (percentage of gross domestic product), and over time.

At the international level, OECD tracks per-pupil spending of its member nations. It calculates expenditures in U.S. dollar equivalencies for meaningful comparisons. OECD analyzes cumulative expenditures over the duration of a student's education, from age 6 to 15 (Table 6).

Table 6.
Cumulative expenditures by educational institutions per student ages 6 to 15 in 32 OECD member nations, 2009

Nation	Expenditures	Nation	Expenditures
Luxembourg	$176,013	Spain	$85,117
Switzerland	$122,797	Finland	$83,774
Norway	$120,349	Japan	$82,857
United States	**$116,268**	France	$81,121
Austria	$115,563	Germany	$75,259
Denmark	$109,017	Korea	$73,854
Iceland	$100,022	New Zealand	$70,090
Netherlands	$94,678	Portugal	$68,931
United Kingdom	$94,583	Estonia	$58,390
Belgium	$93,146	Czech Republic	$55,168
Slovenia	$91,883	Israel	$54,580
Sweden	$91,763	Poland	$52,038
Ireland	$90,743	Slovak Republic	$48,712
Canada	$89,966	Hungary	$46,292
Australia	$89,113	Chile	$29,456
Italy	$88,992	Mexico	$22,688

Adapted from *Education at a Glance 2012: OECD Indicators–Chapter B: Financial and Human Resources Invested in Education–Indicators* (Table B1.3b), by the Organisation for Economic Co-operation and Development, 2012, Paris: Organisation for Economic Co-operation and Development. Copyright 2012 by Organisation for Economic Co-operation and Development.

The data show that the United States spends significantly more on K–12 education than most other OECD countries. In 2009, it spent an average of 40% more than the nations with four of the five next largest economies: approximately 40% more than Japan, 54% more than Germany, 43% more than France, and 23% more than the United Kingdom (no data on education expenditures were reported for China). It also spent significantly more than nations with much higher performing education systems: approximately 29% more than Canada, 57% more than South Korea, 66% more than New Zealand, and 39% more than Finland.

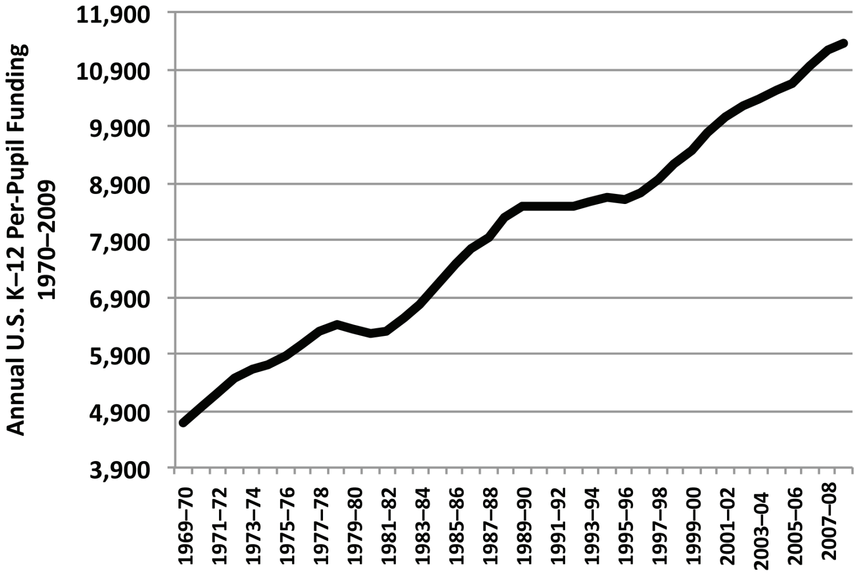

Figure 24. Expenditures per pupil in public elementary and secondary schools, 1970–2009. Adjusted for inflation (2009–10 dollars).

Data are drawn from Snyder and Dillow (2012b, p. 272).

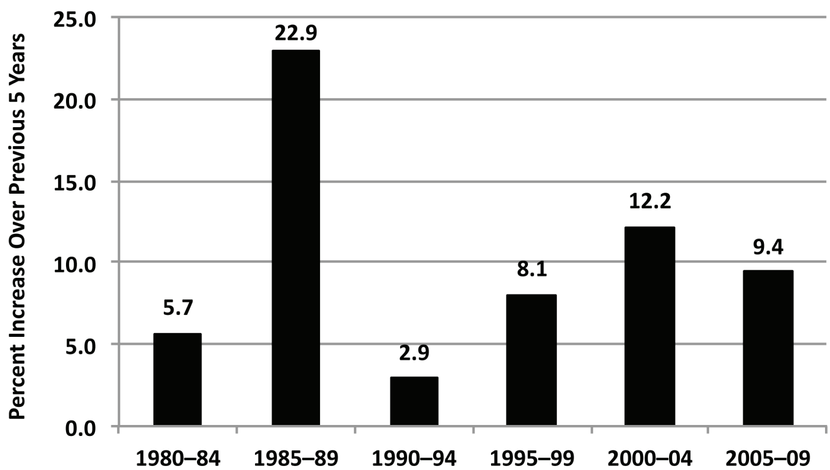

Figure 25. Percent of increase in per-pupil spending over the previous 5 year period (1980–2009). Adjusted for inflation (2009–10 dollars).

Data are drawn from Snyder and Dillow (2012b, p. 272).

When benchmarked against itself over time, expenditure data show that the United States has been steadily increasing the amount of money it spends on K–12 education. Figure 24 shows the trend over the past 40 years. Figure 25 shows the percentage of increase in 5-year increments.

The United States has seen periods of dramatic increases in "real spending" (increases in spending over annual inflation) for K–12 education. These have often been driven by various calls to action and reform initiatives. The 5 years following the publication of *A Nation at Risk*, 1985 through 1989 saw spending increase nearly 23% (Gardner et al., 1983). The 15-year period from 1995 through 2009 saw an increase of nearly 30%, much of it coinciding with the No Child Left Behind initiative. In terms of total spending, the United States has clearly committed an ever-increasing amount of financial resources to education.

Another benchmark metric for evaluating the funding effort is to look at the percentage of gross domestic product (GDP) spent on education. GDP is an accepted measure of a nation's wealth or standard of living. It represents the market value of the goods and services produced within a country in a given period. Table 7 examines the percentage of GDP spent on K–12 education by OECD nations in 2009.

Table 7.
Expenditure on educational institutions as a percent of GDP, 2009

Nation	% GDP Spent on Education	Nation	% GDP Spent on Education
Iceland	5.16	Israel	4.03
New Zealand	5.16	Mexico	3.99
Denmark	4.77	Portugal	3.98
Ireland	4.66	Slovenia	3.96
Korea	4.66	Austria	3.86
United Kingdom	4.48	Chile	3.65
Belgium	4.44	Poland	3.64
Switzerland	4.39	Canada	3.63
United States	**4.27**	Italy	3.39
Sweden	4.24	Luxembourg	3.33
Australia	4.22	Spain	3.32
Estonia	4.17	Germany	3.31
Norway	4.16	Slovak Republic	3.07
Netherlands	4.14	Japan	2.99
Finland	4.10	Hungary	2.95
France	4.07	Czech Republic	2.90

Adapted from *Education at a Glance 2012: OECD Indicators* (p. 244), by the Organisation for Economic Co-operation and Development, 2012, Paris: Organisation for Economic Co-operation and Development. Copyright 2012 by Organisation for Economic Co-operation and Development.

Although the United States was not ranked quite as high as it was in cumulative expenditures (Table 6), it still spent a higher percentage of GDP on education than many other OECD nations in 2009. However, the percentage of GDP spent by the United States is an accumulation of individual state spending, which presents a different picture.

The Education Law Center generates an annual report on school funding in which it takes the level of analysis to the state level, calculating the percentage of each state's GDP allocated to education. Its results for 2009 are summarized in Table 8.

Table 8.
Expenditure on education by state as a function of state GDP, 2009

State	% GDP Spent on Education	State	% GDP Spent on Education	State	% GDP Spent on Education
Vermont	5.7	Arkansas	4.1	Hawaii	3.5
New Jersey	5.0	Wisconsin	4.1	Maine	3.5
New York	4.9	Alaska	4.0	Utah	3.3
New Hampshire	4.5	Mississippi	3.9	Florida	3.3
Indiana	4.5	Montana	3.9	Nevada	3.2
West Virginia	4.4	Kentucky	3.9	Louisiana	3.2
Maryland	4.4	Iowa	3.9	Oklahoma	3.1
South Carolina	4.4	Alabama	3.8	Washington	3.1
Michigan	4.3	Texas	3.8	California	3.1
New Mexico	4.3	Massachusetts	3.7	Colorado	3.1
Ohio	4.2	Illinois	3.7	Oregon	3.1
Kansas	4.2	Idaho	3.6	Arizona	3.0
Pennsylvania	4.2	Nebraska	3.6	Tennessee	3.0
Wyoming	4.2	Minnesota	3.6	North Dakota	2.9
Rhode Island	4.1	Missouri	3.5	South Dakota	2.6
Georgia	4.1	Virginia	3.5	Delaware	2.5
Connecticut	4.1	North Carolina	3.5		

Adapted from *Is School Funding Fair? A National Report Card* (p. 22), by B. Baker, D. Sciarra, and D. Farrie, 2012, Newark, NJ: Education Law Center. Copyright 2012 by Education Law Center.

The analysis shows great disparity among states in terms of funding effort. Vermont (5.7% of GDP) spends twice as much of its GDP as either Delaware or South Dakota. The average of the top 10 states is 4.64%, which is 57% higher than the average of the bottom 10 at 2.95%. These results are discussed further in the next section.

Overall, from a total funding effort perspective, the data suggest that the United States demonstrates a high funding effort in the amount it spends on education. However, this effort is not equal across individual states.

FUNDING EQUITY ACROSS STATES, SCHOOL DISTRICTS, AND INDIVIDUAL SCHOOLS

This benchmark analyzes annual per-pupil spending equity for K–12 education at three different organizational levels: state, school district, and individual school. At the state level, the most recent data from NCES, for the 2008–09 school year, showed tremendous disparity in funding, ranging from states spending large amounts annually per pupil—for example, New York ($19,212) and New Jersey ($18,367)—to states spending considerably less—notably, Idaho ($8,601) and Utah ($8,446). The per-pupil spending for the District of Columbia ($26,753) was significantly higher than for any state (Snyder & Dillow, 2012b).

However, individual states and jurisdictions such as the District of Columbia have different economic conditions that can make comparisons difficult. An analysis by the Education Law Center calculated an adjusted per-pupil spending level that took into account factors beyond a state or jurisdiction's control, such as student poverty, regional wage variation, economies of scale, and population density. The results are shown in Table 9.

Table 9.
State K–12 annual per-pupil spending adjusted for regional factors, 2009

State	Adjusted PPS	State	Adjusted PPS	State	Adjusted PPS
Wyoming	$19,520	Kansas	$11,060	Colorado	$9,198
Alaska	$17,967	Wisconsin	$10,807	Missouri	$9,163
New York	$17,375	Iowa	$10,764	Oregon	$9,129
New Jersey	$16,817	Ohio	$10,625	Nevada	$9,094
Connecticut	$15,693	Virginia	$10,621	Alabama	$9,071
Vermont	$15,020	Nebraska	$10,404	Florida	$8,975
Dist. of Columbia	$14,596	Louisiana	$10,289	Kentucky	$8,930
Massachusetts	$14,091	New Mexico	$10,113	California	$8,897
Maryland	$13,505	West Virginia	$9,995	Texas	$8,862
Rhode Island	$13,047	Illinois	$9,841	Arkansas	$8,808
Delaware	$13,031	North Carolina	$9,754	South Dakota	$8,575
Pennsylvania	$12,976	Washington	$9,686	Mississippi	$7,930
Hawaii	$12,445	South Carolina	$9,657	Arizona	$7,899
New Hampshire	$12,206	Michigan	$9,611	Idaho	$7,509
Maine	$12,125	North Dakota	$9,542	Oklahoma	$7,449
Minnesota	$11,533	Georgia	$9,458	Utah	$7,379
Indiana	$11,065	Montana	$9,300	Tennessee	$7,306

Adapted from *Is School Funding Fair? A National Report Card* (p. 12), by B. Baker, D. Sciarra, and D. Farrie, 2012, Newark, NJ: Education Law Center. Copyright 2012 by Education Law Center.

The average annual per-pupil spending level in the United States in 2009 was $10,774. The range of disparity among states was remarkable, reflecting a significant lack of funding equity. Wyoming spent $12,214 more per year per pupil than Tennessee (a difference of 167%). The five top-spending states averaged $17,474 per pupil spending, or 133% more than the $7,508 average of the bottom five states. As state funding formulas are primarily responsible for how much money is spent, this inequity is of enormous significance.

The funding disparity continues at the individual school district level, even within the same state. In 2010, the Center for American Progress completed an analysis that looked at the academic outcomes of individual school districts by their spending levels (Boser, 2011). As with the previous study, this study was careful to establish criteria that would control for factors outside a district's control, such as cost of living and students with special needs (English language learners, special education, low income). The following table examines the range of funding at the school district level within selected states. Specifically it looks at the average per-pupil spending for each state's 10 school districts with the least funding, and the 10 school districts with the greatest funding. The states selected for discussion were three of the four top states in terms of per-pupil spending in 2008 (Alaska had no school district data), three from the mid-range, and the three states with the lowest per-pupil spending.

Table 10.
Disparity of per-pupil funding between individual school districts within selected states

STATE	Average PPS for 10 Lowest Funded School Districts	Average PPS for 10 Highest Funded School Districts	PPS Difference Between Lowest and Highest	% Difference
HIGH PPS STATES				
Wyoming	$11,367	$18,161	$6,794	60%
New York	$9,649	$21,756	$12,107	125%
New Jersey	$7,896	$15,070	$7,174	91%
MID PPS STATES				
New Mexico	$6,512	$12,628	$6,116	94%
West Virginia	$7,352	$9,306	$1,954	27%
Illinois	$4,971	$10,733	$5,762	116%
LOW PPS STATES				
Oklahoma	$5,141	$11,747	$6,606	128%
Utah	$4,551	$8,482	$3,931	86%
Tennessee	$5,010	$7,953	$2,943	59%

Data are drawn from Center for American Progress, 2011.

These data suggest significant differences in funding at the school district level within states, ranging from a 27% difference in West Virginia to a 128% difference in Oklahoma. They also suggest that these differences occur irrespective of overall level of per-pupil spending in a state. The average disparity among school districts was 92% in the three states with the highest per-pupil spending, 79% in the three mid-range states, and 91% in the three states with the lowest per-pupil spending. The complexities of state funding formulas clearly result in inequitable funding at the school district level within states.

Table 11 provides a more detailed analysis of funding by school districts in one state, California, in 2008.

Table 11.
Disparity of per-pupil spending among individual school districts in California

Number of Districts	Adjusted Per-Pupil Spending Range
13	$3,747 – $4,392
102	$5,046 – $5,985
109	$6,001 – $6,989
28	$7,001 – $7,940
18	$8,034 – $8,988
13	$ 9,113 – $9,979
7	$10,002 – $10,945
4	$11,382 – $12,663
7	$13,192 – $14,517
3	$17,099 – $19,168

Data are drawn from Center for American Progress, 2011.

The results are startling. The annual per-pupil spending in individual districts ranged from $3,747 to $19,168. The statistics speak for themselves: 13 districts spent less than $5,000 per pupil annually; 115 spent less than $6,000; and 21 spent more than $10,000. Even among the districts that spent over $10,000 per pupil there was considerable disparity: The 3 districts at the highest end of the range spent almost twice as much as the 7 districts spending just over $10,000. It is hard to justify such an inequitable distribution of resources.

The Center for American Progress issued a 2012 report (Spatig-Amerikaner, 2012) documenting the fact that funding inequalities also exist between individual schools within school districts. It offered the following conclusions:

- While 59% of the inequity was the result of funding differences between school districts within a state, 41% was the result of differential funding of individual schools within a district.
- The per-pupil spending difference attributed to individual schools varied

from state to state, from 77% in South Carolina to 9% in Arizona.
- The primary mechanism driving this phenomenon was the district placing the least experienced, lowest paid teachers in high-minority, high-poverty schools.

The macro benchmark data reflect an education system that is rife with inequities in funding at all levels of the system, leading to the question of whether these inequities are random or systematic.

FUNDING PROGRESSIVITY (EQUITY ACROSS ETHNICITY AND SOCIO-ECONOMIC METRICS)

Funding equity: Federal education law mandates that services provided by a district receiving state and local funds be made available to all attendance areas and all children without discrimination. In particular, it references funding for Title I schools (schools in which 40% or more of students qualify for FRLP). "Title I of the *Elementary and Secondary Education Act of 1965 (ESEA)* requires that schools receiving funds under Title I receive state- and locally-funded services that, taken as a whole, are at least comparable to the state- and locally-funded services provided to non–Title I schools" (Heuer & Stullich, 2011).

Funding progressivity: In several of its research reviews, PISA noted that "many of the world's successful education systems…invest money where the challenges are greatest, rather than making the resources that are devoted to schools dependent on the wealth of the local communities in which schools are located" (OECD, 2011). Specifically, "With the exception of Israel, Turkey, and the United States, where socio-economically disadvantaged schools also tend to be deprived of basic resources, such as favorable student-staff ratios, OECD countries try to place at least an equal, if not larger, number of teachers in socio-economically disadvantaged schools as they do in advantaged schools" (OECD, 2010b).

In its study on school funding, the Education Law Center identified one of its fairness measures as the extent to which state funding systems are sensitive to changes in the rate of poverty. In progressively funded states, poor districts get more funding than wealthy districts. In regressively funded states, poor districts receive less than wealthy districts (Baker, Sciarra, & Farrie, 2012).

We have already seen that funding is not equal at any level of the education funding system: state, school district, individual schools. The funding progressivity question is as follows: How much of the inequity in funding is related to poverty level and to student ethnicity? The Education Law Center examined state funding in the context of each school district's poverty level (percentage of students at the poverty level). It defined progressively funded states as those with a higher ratio of funding for poor districts than wealthy districts, and regressively funded states as those with a lower ratio of funding for poor districts than wealthy districts. Table 12 shows results for the five most "progressive" states and the five most "regressive" states.

Table 12.
The states with the most progressive and the most regressive education funding systems as shown by funding distribution according to poverty level, 2009

	At 0% Poverty	At 10% Poverty	At 20% Poverty	At 30% Poverty	Ratio High/ Low
Five States with the MOST PROGRESSIVE Funding Ratios					
Utah	$5,772	$6,732	$7,851	$9,157	159%
New Jersey	$13,961	$15,687	$17,626	$19,805	142%
Ohio	$8,993	$9,983	$11,082	$12,301	137%
Minnesota	$10,026	$10,945	$11,948	$13,043	130%
Massachusetts	$12,598	$13,513	$14,496	$15,550	123%
Five States with the MOST REGRESSIVE Funding Ratios					
Nevada	$10,561	$9,617	$8,757	$7,974	76%
Illinois	$11,312	$10,367	$9,501	$8,707	77%
North Carolina	$11,111	$10,240	$9,438	$8,699	78%
New Hampshire	$13,958	$12,833	$11,799	$10,849	78%
North Dakota	$10,774	$9,985	$9,254	$8,577	80%

Adapted from *Is School Funding Fair? A National Report Card* (pp. 14–15), by B. Baker, D. Sciarra, and D. Farrie, 2012, Newark, NJ: Education Law Center. Copyright 2012 by Education Law Center.

The data collected for 2009 highlight a number of points:

- There is a wide variation in education funding within states at the school district level relative to the percentage of students who live in poverty.
- The most progressive states spent significantly more (between 23% and 59% more) on high-poverty school districts than on low-poverty school districts.
- The most regressive states spent significantly less on high-poverty school districts, allocating just 76% to 80% of the amount they sent to low-poverty districts.
- These variations in funding patterns were not related to the overall

per-pupil spending of the state (e.g., Utah has a progressive funding model despite the fact it has one of the lowest overall PPS levels of all states, New Hampshire has a regressive model while ranking in the top third of overall PPS).

- The clear linearity of the data that followed each level of poverty was even clearer when graphed. There was a consistent relationship between poverty level and funding in the five most progressive and the five most regressive states (Figures 26 and 27).

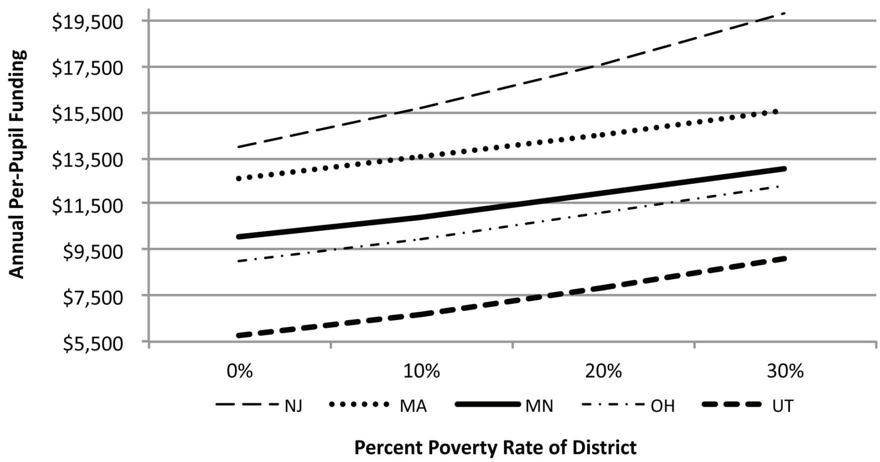

Figure 26. Funding by school district poverty levels in the five most progressive states, 2009.

Data are drawn from Baker, Sciarra, and Farrie (2012, p. 14).

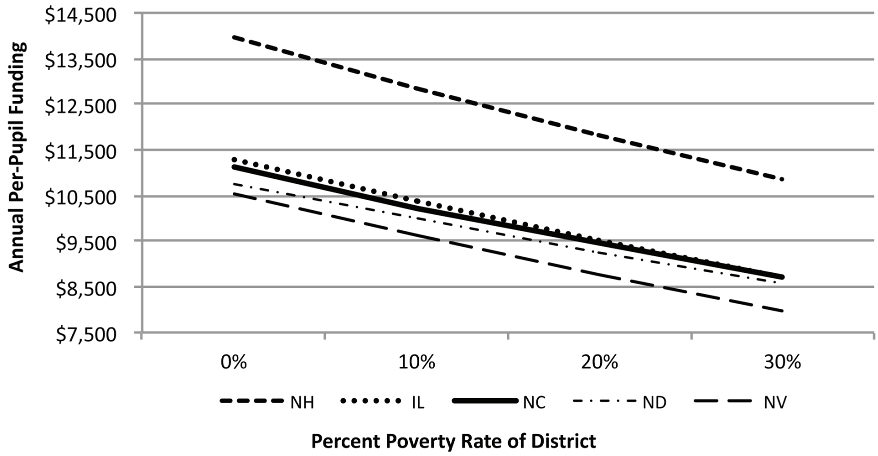

Figure 27. Funding by school district poverty levels in the five most regressive states, 2009.

Data are drawn from Baker, Sciarra, and Farrie (2012, p. 14).

The Education Law Center's report concluded that only 17 states had progressive funding systems, in which high-poverty school districts received more funding than low-poverty districts; 15 states had flat funding systems, in which there was no appreciable difference in the amount of funding; and 16 states had regressive funding systems, in which high-poverty school districts received less funding than low-poverty districts. (Hawaii and the District of Columbia were excluded because each has only one school district; Alaska was excluded from the within-state distribution analysis because of its unique geography and sparse population) (Baker et al., 2012).

This analysis was replicated by Baker and Corcoran (2012). They identified the same five most regressive states as the Education Law Center report did, with comparable, although sometimes even lower funding for high-poverty schools than low-poverty schools. In New Hampshire, high-poverty school districts received only 64% of the funding that low-poverty districts did. In Nevada, poor districts received 67% of the amount that went to wealthy districts, and in North Carolina that figure was 73%, in Illinois 81%, and in North Dakota 81%.

Spatig-Amerikaner (2012) identified a disturbing trend in the inequity of school funding linked to race. His study came to the following conclusions about data collected for 2009:

- Schools across the nation spent $334 more per White student than per non-White student. (That amount represented approximately 8% of the median per-pupil spending nationwide.)

- Schools whose enrollment was more than 90% White spent $733 more per student than schools whose enrollment was more than 90% non-White students. (That amount represented approximately 18% of the median per-pupil spending nationwide.)
- Each increase of 10% in a school's non-White students was associated with a decrease in spending of $75 per student.
- The primary mechanism driving this funding inequity based on race was the district placing the least experienced, lowest paid teachers in high minority, high-poverty schools.

RESOURCE QUALITY

In terms of quality of resources, the primary metric relates to the quality of teachers. Various analyses have demonstrated that minority students and students from lower socio-economic backgrounds are much more likely to have less experienced teachers with higher turnover rates. Figure 28 examines the percentage of first-year teachers in high-poverty versus low-poverty schools.

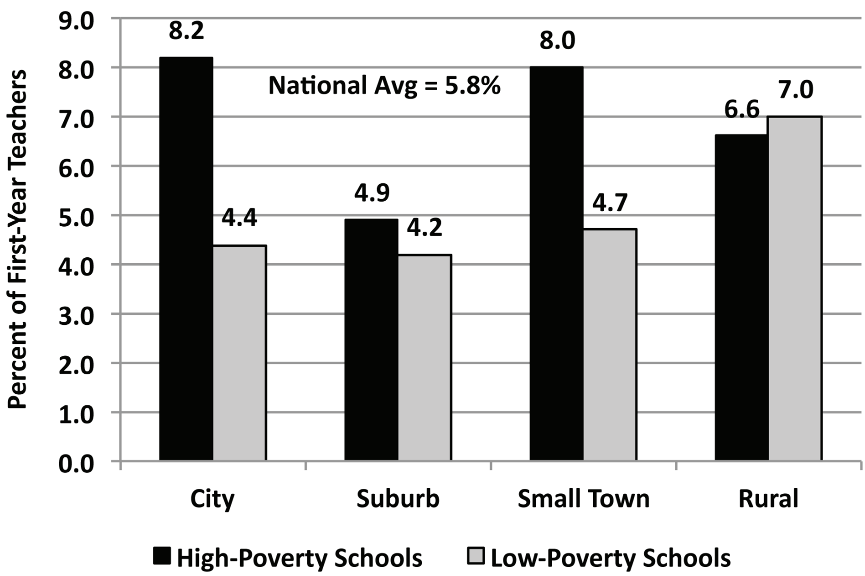

Figure 28. Percent of first-year teachers by school poverty level.

Adapted from *Not Prepared for Class: High-Poverty Schools Continue to Have Fewer In-Field Teachers* (p. 21), by S. Almy and C. Theokas, 2010, Washington, DC: The Education Trust.

First-year teachers are often the least experienced and least effective teachers. They are also the least equipped to work with children who have greater educational needs. Yet, in cities and small towns, the percentage of first-year teachers in high-poverty schools was almost twice as high as in low-poverty schools during 2007–08. In suburbs and rural areas, the percentages of first-year teachers in high-poverty and low-poverty schools were more similar during that same year.

Another critical metric for measuring teacher effectiveness is teacher turnover. Figures 29 analyzes teacher turnover by schools based on their percentage of students qualifying for FRPL. Figure 30 looks at teacher turnover by schools based on their percentage of minority students.

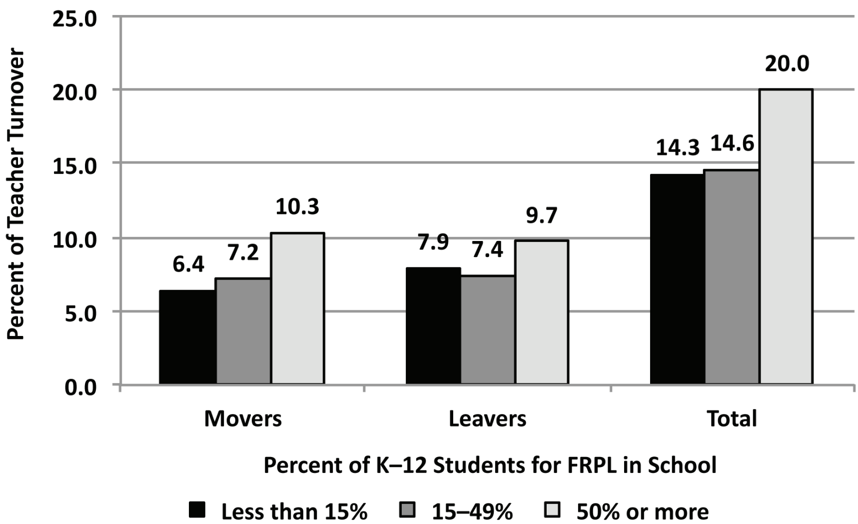

Figure 29. Teacher turnover by K–12 students qualifying for FRPL.

Data are drawn from Marvel, Lyter, Peltola, Strizek, and Morton (2006, p. 9).

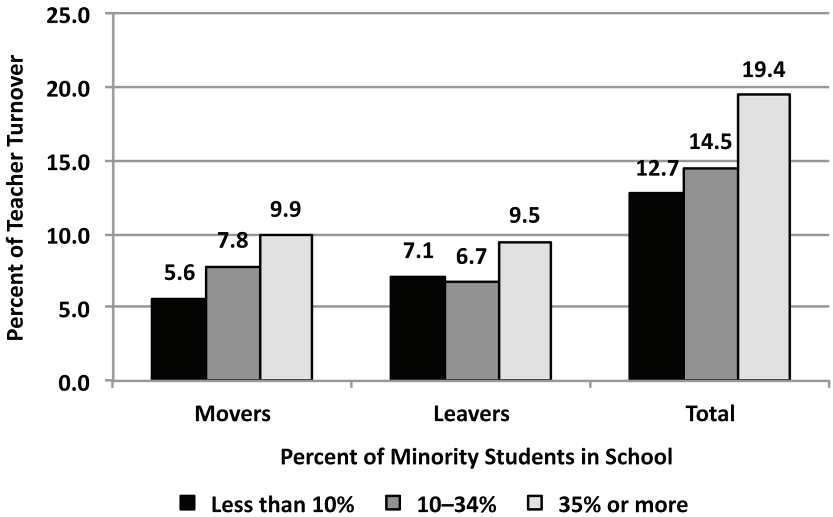

Figure 30. Teacher turnover by percent of minority students in K–12. Data are drawn from Marvel, Lyter, Peltola, Strizek, and Morton (2006, p. 9).

As with funding equity, there is a linear relationship between teacher turnover and a school's poverty level. In 2003–04, schools with 50% or more of their children qualifying for free or reduced-price lunches had a 40% greater teacher turnover than schools with less than 15% of their children qualifying for FRPL (20% versus 14.3%). The same linear relationship was evident in a school's student ethnicity. Schools with 35% or more minority students had a 53% greater teacher turnover (19.4% versus 12.7%). While some small percentage of turnover may be beneficial if the least effective teachers leave, this level of turnover certainly affects the overall quality of the teaching staff at a school. It also raises the question of why teachers were more likely to leave these schools.

A more thorough study of the issue of teacher quality was conducted by the Illinois Education Research Council, which developed the Teacher Quality Index. The TQI measures the quality of teachers in a school using teacher attributes that research suggests affect student performance. The council amassed a TQI database of all teachers by school and assigned each school a TQI rating. It then ranked schools into four quartiles. The schools in the top quartile had the highest ranking (teachers who were better educated and more experienced and whose academic skills were stronger). The schools in the fourth quartile had the lowest ranking. The council cross-referenced all the schools by each school's percentage of minority students and level of poverty, resulting in the data shown in Figures 31 and 32.

Figure 31 displays student minority data for the schools in the bottom TQI quartile (schools with the weakest teachers). Figure 32 displays school minority data for the schools in the top TQI quartile (schools with the strongest teachers). Each figure leads to the same conclusion: As a school's minority enrollment increases teacher quality decreases (Peske & Haycock, 2006).

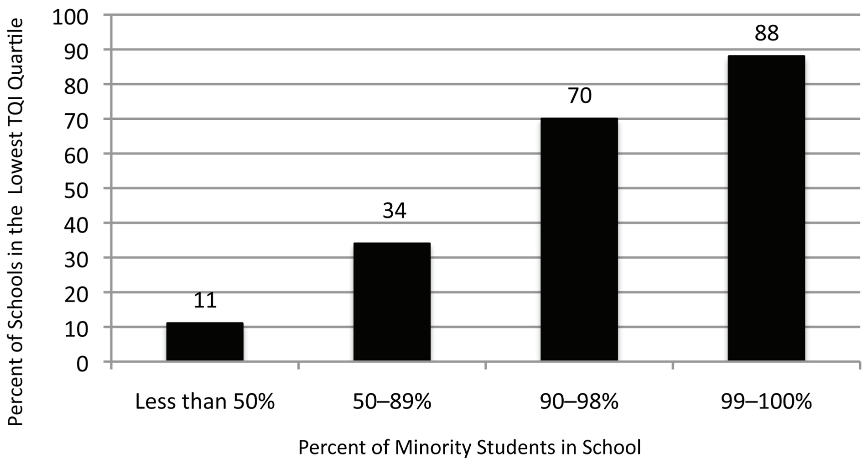

Figure 31. Percent of student minority in schools with the lowest teacher quality.

Adapted from *Teacher Inequality: How Poor and Minority Students Are Shortchanged on Teacher Quality* (p. 7), by H. G. Peske and K. Haycock, 2006, Washington, DC: The Education Trust.

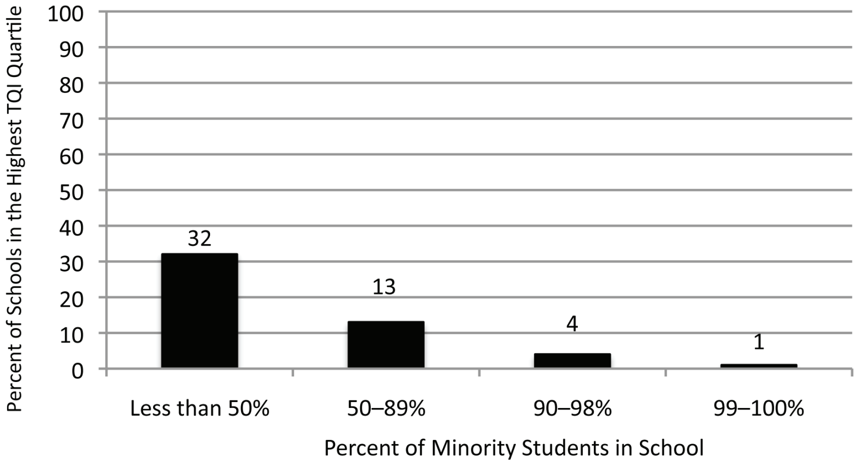

Figure 32. Percent of student minority in schools with the highest teacher quality.

Adapted from *Teacher Inequality: How Poor and Minority Students Are Shortchanged on Teacher Quality* (p. 7), by H. G. Peske and K. Haycock, 2006, Washington, DC: The Education Trust.

The following figures examine the same teacher quality data in the context of school poverty levels. Figure 33 displays school poverty data for the schools in the bottom TQI quartile (schools with the weakest teachers). Figure 34 displays school poverty data for the schools in the top TQI quartile (schools with the strongest teachers). As with minority levels, the conclusion is clear: As a school's poverty enrollment increases teacher quality decreases (Peske & Haycock, 2006).

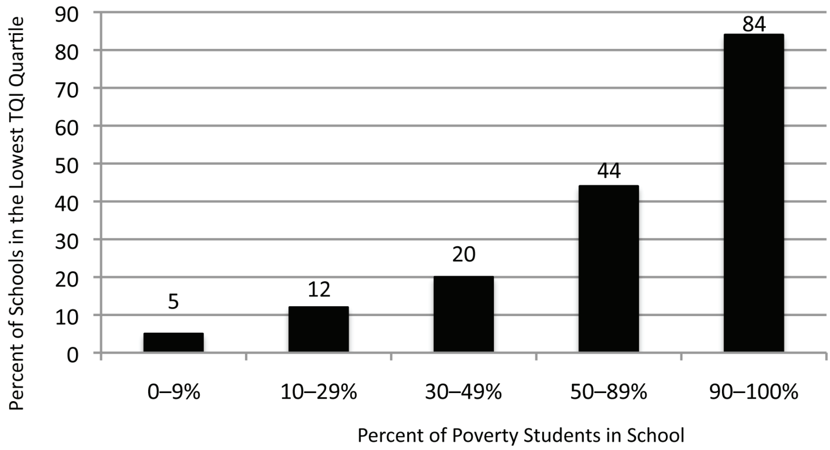

Figure 33. Percent of poverty students in schools with the lowest teacher quality.

Adapted from *Teacher Inequality: How Poor and Minority Students Are Shortchanged on Teacher Quality* (p. 7), by H. G. Peske and K. Haycock, 2006, Washington, DC: The Education Trust.

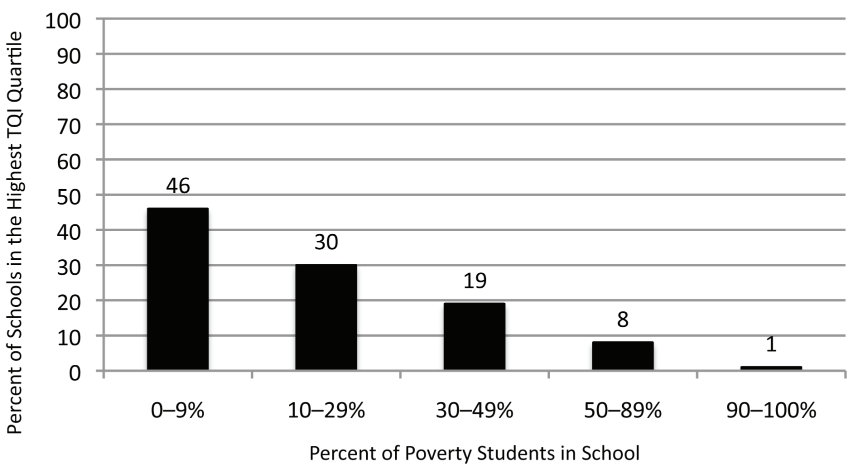

Figure 34. Percent of poverty students in schools with the highest teacher quality.

Adapted from *Teacher Inequality: How Poor and Minority Students Are Shortchanged on Teacher Quality* (p. 7), by H. G. Peske and K. Haycock, 2006, Washington, DC: The Education Trust.

The linear nature of the data makes a strong case that schools with higher percentages of minority or poor students do not have equal access to quality resources where it matters most, the point of delivery.

PISA also examined the question of equity in distribution of educational resources. Its analysis looked at (a) whether or not all schools received equal access to educational resources (quality and quantity) regardless of socio-economic background, (b) whether or not more and better resources were devoted to more advantaged schools, or (c) whether or not more and better resources were devoted to disadvantaged schools.

In particular, the PISA analysis looked at the index of teacher shortage and the index of quality of educational resources. In both categories, in 2009 the United States fell far behind other OECD countries:

In terms of equity in access to resources (allocation of teachers per students to disadvantaged schools), the United States ranked 30th of 34 OECD countries (OECD, 2011).

In terms of equity in quality of educational resources across all schools, the United States ranked 28th of 34 OECD countries (OECD, 2011).

The PISA report noted that "…in 16 OECD countries, the student-teacher ratio relates positively to the socio-economic background of schools. In these countries, more disadvantaged schools tend to have more teachers in comparison with the number of students, which signals that around half of OECD countries try to allocate more teachers to socio-economically disadvantaged schools, presumably with the objective of moderating that disadvantage….Among OECD countries, only in Turkey, Slovenia, Israel, and the United States are socio-economically disadvantaged schools characterized by higher student-teacher ratios; that is, in these countries disadvantaged schools tend to be worse off in the availability of teachers" (OECD, 2010b).

High equity benchmark review

The macro data in this benchmark portray an education system that clearly is not equitable in its learning outcomes, or in the allocation of funding and human capital resources (teachers and principals). The system is particularly inequitable in dealing with students of certain races and from lower socio-economic backgrounds.

The preponderance of evidence suggests the following conclusions regarding learning outcome equity:

- Students who are Black or Hispanic have significantly lower high school graduation rates, higher dropout rates, and lower test scores than White students.

- Students from higher poverty families have significantly higher drop-out rates and lower test scores than those who are from lower poverty families.
- Neither the level of disparity nor the trend has improved in any meaningful way since the early 1990s, when data first became available.
- There is an increasing clustering of students into high-poverty, high-minority schools, which receive less funding and have a higher record of underperformance than low-poverty schools.

The preponderance of evidence suggests the following conclusions regarding resource equity:

- While the United States spends significantly more money on K–12 education than the majority of the other nations, it is not equitably spent across states, school districts, or schools.
- In one third of the states, there is an inverse relationship between funding and a school district's poverty level; that is, the higher the poverty level, the lower the funding.
- Across the nation, schools spend an average of 8% less on non-White students than on White students.
- High-poverty and/or high-minority schools are significantly more likely to have teachers who are less experienced and less effective than are low-poverty and/or low-minority schools.

The overwhelming preponderance of evidence strongly argues that the United States education system is failing the high equity benchmark.

High efficiency benchmark

The high efficiency benchmark looks at the issue of education productivity. In the business world, this is often referred to as return on investment (ROI). How are education outcomes related to spending? Which education systems get the greatest results for dollars spent? The data suggest that spending alone does not necessarily result in improved outcomes. An increasing amount of evidence reinforces the conclusion that there is no direct relationship between funding and school success. The lack of a direct link between per-pupil spending and education outcome is apparent at all levels of macro analysis—international, national, state, and school district.

International

Internationally, the United States spends more per student than any other nations except Luxembourg, Switzerland, and Norway. How does that compare with our ranking on PISA test scores? The following tables provide data on each country's lifetime spending on K–12 education along with its 2009 PISA test scores. Table 13 sorts countries by their 2009 PISA reading test scores and also shows their spending levels. Table 14 sorts the same countries by their 2009 PISA mathematics test scores.

Table 13.
International spending by 2009 PISA reading test scores

Country	2009 Lifetime Per-Pupil Spending	2009 PISA Reading Score
Korea	$73,854	539
Finland	$83,774	536
Canada	$89,966	524
New Zealand	$70,090	521
Japan	$82,857	520
Australia	$89,113	515
Netherlands	$94,678	508
Belgium	$93,146	506
Norway	$120,349	503
Estonia	$58,390	501
Switzerland	$122,797	501
Iceland	$100,022	500
Poland	$52,038	500
United States	**$116,268**	**500**
Germany	$75,259	497
Sweden	$91,763	497
France	$81,121	496
Ireland	$90,743	496
Denmark	$109,017	495
United Kingdom	$94,583	494
Portugal	$68,931	489
Italy	$88,992	486
Slovenia	$91,883	483
Spain	$85,117	481
Czech Republic	$55,168	478
Slovak Republic	$48,712	477
Israel	$54,580	474
Luxembourg	$176,013	472
Austria	$115,563	470
Chile	$29,456	449
Mexico	$22,688	425

Data are drawn from Organisation for Economic Co-operation and Development (OECD) (2012a, p. 228), and Organisation for Economic Co-operation and Development (OECD) (2010c, p. 15).

Table 14.
International spending by 2009 PISA math test scores

Country	2009 Lifetime Per-Pupil Spending	2009 PISA Math Score
Korea	$73,854	546
Finland	$83,774	541
Switzerland	$122,797	534
Japan	$82,857	529
Canada	$89,966	527
Netherlands	$94,678	526
New Zealand	$70,090	519
Belgium	$93,146	515
Australia	$89,113	514
Germany	$75,259	513
Estonia	$58,390	512
Iceland	$100,022	507
Denmark	$109,017	503
Slovenia	$91,883	501
Norway	$120,349	498
France	$81,121	497
Slovak Republic	$48,712	497
Austria	$115,563	496
Poland	$52,038	495
Sweden	$91,763	494
Czech Republic	$55,168	493
United Kingdom	$94,583	492
Luxembourg	$176,013	489
Ireland	$90,743	487
Portugal	$68,931	487
United States	**$116,268**	**487**
Italy	$88,992	483
Spain	$85,117	483
Israel	$54,580	447
Chile	$29,456	421
Mexico	$22,688	419

Data are drawn from Organisation for Economic Co-operation and Development (OECD) (2012a, p. 228), and Organisation for Economic Co-operation and Development (OECD) (2010c, p. 15).

The United States' greater level of spending has not produced commensurate results. Most of the nations with higher scores in reading spent a fraction of what the United States did. The top five nations in reading scores spent an average of $80,108 on lifetime per-pupil spending, which was 69% of what the United States expended. New Zealand spent approximately 60% of the United States' total, with superior results. The data on spending and math scores in Table 14 show a similar pattern. Most of the higher performing nations spent a fraction of what the United States spent, with substantially better results.

National

At the national level, the same disconnect can be seen. As was noted in the previous section, K–12 per-pupil spending has increased steadily over the past 40 years with virtually no gain in two of the most critical performance benchmarks: NAEP test scores in reading and mathematics and high school graduation rates.

State

State funding shows much the same pattern. There is very little correlation between the amount of money spent and student outcomes. The next two tables look at selected states' K–12 per-pupil spending in relation to student outcomes: Table 15 analyzes high school graduation rates, and Table 16 examines fourth-grade NAEP reading scores. In each table, 20 states are grouped by comparable student outcomes:

- group one: the five highest performing states
- group two and three: two groups of five states with virtually identical performance outcomes
- group four: the five lowest performing states.

The question is, are states spending comparable amounts to achieve comparable outcomes?

Table 15.
State per-pupil spending by graduation rates, 2008–09

State	Annual PPS 2008–09	High School Grad Rate 2008–09	Average Scores by Groups	
GROUP ONE				
Wisconsin	$10,807	90.7%		
Vermont	$15,020	89.6%	**score avg.**	88.2%
North Dakota	$9,542	87.4%	**PPS avg.**	$11,533
Minnesota	$11,533	87.4%	**PPS range**	$5,478
Iowa	$10,764	85.7%	**high/low diff.**	57%
GROUP TWO				
Idaho	$7,509	80.6%		
Pennsylvania	$12,976	80.5%	**score avg.**	80.3%
Kansas	$11,060	80.2%	**PPS avg.**	$11,435
Maryland	$13,505	80.1%	**PPS range**	$5,996
Maine	$12,125	79.9%	**high/low diff.**	80%
GROUP THREE				
Texas	$8,862	75.4%		
Connecticut	$15,693	75.4%	**score avg.**	75.4%
Michigan	$9,611	75.3%	**PPS avg.**	$11,932
Rhode Island	$13,047	75.3%	**PPS range**	$6,831
Hawaii	$12,445	75.3%	**high/low diff.**	77%
GROUP FOUR				
South Carolina	$9,657	66.0%		
New Mexico	$10,113	64.8%	**score avg.**	62.3%
Dist. of Columbia	$14,596	62.4%	**PPS avg.**	$10,278
Mississippi	$7,930	62.0%	**PPS range**	$6,666
Nevada	$9,094	56.3%	**high/low diff.**	84%

Data are drawn from Baker, Sciarra, and Farrie (2012, p. 12) and Snyder and Dillow (2012a).

Table 16.
State per-pupil spending by fourth-grade NAEP reading scores, 2008–09

State	Annual PPS 2008–09	4th-Grade NAEP Reading 2009	Average Scores by Groups	
GROUP ONE				
Massachusetts	$14,091	234		
New Jersey	$16,817	229	score avg.	230
New Hampshire	$12,206	229	PPS avg.	$14,765
Connecticut	$15,693	229	PPS range	$4,611
Vermont	$15,020	229	high/low diff.	38%
GROUP TWO				
New York	$17,375	224		
Kansas	$11,060	224	score avg.	224
Missouri	$9,163	224	PPS avg.	$12,540
Maine	$12,125	224	PPS range	$8,212
Pennsylvania	$12,976	224	high/low diff.	90%
GROUP THREE				
Wisconsin	$10,807	220		
North Carolina	$9,754	219	score avg.	219
Utah	$7,379	219	PPS avg.	$9,329
Illinois	$9,841	219	PPS range	$3,428
Texas	$8,862	219	high/low diff.	46%
GROUP FOUR				
Arizona	$7,899	210		
California	$8,897	210	score avg.	207
New Mexico	$10,113	208	PPS avg.	$10,359
Louisiana	$10,289	207	PPS range	$6,697
Dist. of Columbia	$14,596	202	high/low diff.	85%

Data are drawn from Baker, Sciarra, and Farrie (2012, p. 12) and National Center for Education Statistics (NCES) (2011b).

The data in Table 15 suggest very little relationship between per-pupil spending and high school graduation rates. Group One consists of the five states with the highest graduation rates, yet each state spent very different amounts of money to achieve similar results. There was an annual per-pupil spending difference of 57%, or $5,478, between Vermont, which spent the most ($15,020) and North Dakota, which spent the least ($9,542). The graduation rate data from Groups Two and Three were virtually identical within each group, yet the funding difference within Group Two was 80% (Maryland at $13,505 and Idaho at $7,509), and within Group Three 77% (Connecticut at $15,693 and Texas at $8,862). And, finally, in Group Four, the lowest performing five states had a funding difference of 84%, with the District of Columbia spending $14,596 per year compared with Mississippi's annual spending of $7,930. Another way to look at the data is this: North Dakota spent virtually the same amount per pupil in 2008–09 as South Carolina, yet its graduation rate was 21.4 percentage points higher (87.4% versus 66%).

The pattern is repeated in Table 16, where state per-pupil spending is compared with fourth-grade NAEP reading scores. The funding difference within each similar performing group ranged from 38% to 90%. Across both tables, the average disparity in funding within these subgroups of comparable performance was 70%. In other words, within each group, the state spending the most spent an average of 70% more than the state spending the least to achieve similar performance outcomes.

This analysis admittedly relies on gross measures. While calculation of state per-pupil spending accounts for the major variations in economic indicators across states and the performance measures are standard, different states have different opportunities and limitations. However, the size and consistency of the pattern in which state funding seemingly is unrelated to student performance outcome is of such a scale that it is hard to draw any other conclusion than that there is no correlation.

School districts

Finally, there is evidence that differential funding at the district level does not produce commensurate outcomes. In 2011, the Center for American Progress conducted an analysis of the academic outcomes of individual school districts by their spending levels, controlling for factors outside a district's control. The result was a comparative analysis of the relationship between spending and outcomes across individual school districts. The analysis looked at the following two sets of data:

<u>Academic achievement index:</u> The average percentage of students across grades designated at or above proficiency on state assessments in reading and math.

Cost: Current expenditures including salaries, services, and supplies (and excluding capital expenses).

The study published performance (achievement index) and spending (adjusted per-pupil spending) data for every school district across the nation. Table 18 summarizes the data for California's 304 school districts, which are grouped by their achievement index in 10% groupings. For example, 9 districts scored 90% or higher on the achievement index, 27 between 80% and 89%, and so on. The spending gap between the highest spending school district and lowest spending one within a performance group was reported.

Table 17.
California school district return on investment

Achievement Index (2008)	Number of Districts	Adjusted Per-Pupil Spending Range (2008)	Max. Diff.	High/Low
90%	9	$6,425 – $17,572	$11,147	273%
80%	27	$6,043 – $13,486	$7,443	223%
70%	52	$4,493 – $17,099	$12,606	381%
60%	81	$4,358 – $19,168	$14,810	440%
50%	91	$4,747 – $14,517	$9,770	306%
40%	37	$4,992 – $13,257	$8,265	248%
30%	7	$4,527 – $13,739	$9,212	303%

Data are drawn from Center for American Progress, 2011.

As with the previous analyses, there is little correlation between per-pupil spending and student performance. Of the nine school districts that demonstrated an achievement index of 90% or above, per-pupil spending ranged from $6,425 to $17,572. At the opposite end, seven school districts at the 30% achievement index had a per-pupil spending range of $4,527 to $13,739. Each level of student achievement showed similar ranges in spending, with some districts achieving much better student performance with much less spending. The disconnect between spending and student outcomes is as dramatic as it is alarming.

High efficiency benchmark review

The previous analyses highlight both the limitation and the value of return on investment (efficiency) data analysis at the macro level. On the limitation side, this type of data analysis doesn't evaluate the return on investment of specific interventions. On the value side, it does highlight the disconnect between levels of funding and student performance outcomes. This disconnect is apparent across multiple levels of analysis: international, national, state, and school district. Simply spending more money does not necessarily improve student performance.

WHERE DO WE GO FROM HERE?

The performance data in all four benchmark categories—participation, quality, equity, and efficiency—are as compelling as they are distressing. Taken together, the education components (federal, state, school district, local school) constituting our national education system are failing our children and society. An unacceptable number of students do not participate fully in school, let alone graduate. Those who do graduate are not likely to have gained proficiency in reading and mathematics. Children of color and/or from lower socio-economic families are significantly more likely to have fewer and lower quality resources and to perform substantially worse than children who are White and from higher socio-economic families. Despite the fact that the United States spends more money on education than most other nations, researchers can show little if any correlation between funding level and student outcomes. And there is little sign of improvement despite significant reform initiatives over the past 40 years. All of which lead to the questions: Now what? Where do we go from here?

Poor performance outcomes highlight two glaring flaws in our education system: (a) the lack of clear education benchmarks that reflect the outcomes we want as a society and (b) the absence of systematic feedback to inform our decisions. We have a long history of neglecting both critical components.

Our nation has provided public education for over 100 years without clearly resolving the issues of what we expect from our education system in terms of socially relevant outcomes. The four selected benchmark categories in this chapter came from OECD, but hopefully reflect core values that will further the debate and transcend ideology, politics, philosophies, and fads. Whatever one's perspective, it is hard to argue against the importance of evaluating our system by its ability to serve all students, produce quality outcomes, treat everyone equitably, and get the most return on our resources. The question then becomes one of how we measure these benchmarks, which always generates much more debate.

As discussed at the beginning of this chapter, macro-level metrics (standardized tests, graduation rates, dropout rates, per-pupil spending, education resources) have their limitations. They are blunt instruments that move slowly and show only large-scale outcomes and trends. They reflect the overall outcomes of countless interventions across numerous system levels. While we know that the most important feedback is at the micro level—immediate response that drives short-term behavior and affects students directly—there is a critical role for feedback at the macro level. These are the data that tell us how well we are serving *all* our students, which is the ultimate purpose of a national education system.

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